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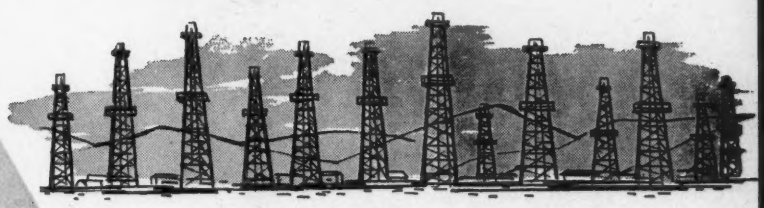

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December 15th, 1956

Island Of Cuba Attracting New Work By California Operator

Oil prospecting and development in Cuba is a growing focal point of interest by both California oil men and operators in other parts of the country.

Ted Jones of Los Angeles, head of the Ted Jones Drilling Company, who has been active in the Cuban oil picture for the last two and one-half years, is president of United Cuban Oil, Inc., which recently was given approval by the Securities and Exchange Commission for the issuance and sale of 2,073,625 shares of common stock. Of the total shares registered, 1,000,000 will be offered to the public.

United Cuban was organized last January by Jones to consolidate production, development and exploration of oil and gas concession rights controlled by him on the north coast of the West Indies Island.

When the new company was formed it acquired all of the Cuban properties, including two complete drilling rigs, concessions and production, as well as the active operation of the development program outlined for the Cuban holdings.

First Well

Jones shipped a drilling rig and equipment to Cuba in October, 1954, and near the close of the year started drilling Jones No. 1 well on the Thomas Bess concession about 12 miles east of the city of Havana on the north shore.

The initial effort was successful and at the time was the deepest producing well on the Island of Cuba at 3475 feet, Jones said.

An offset well, Jones No. 2, was taken to 4339 feet and only one zone at 2508-2528 feet in dolomite was tested and perforated. The well came in flowing and is still flowing. Other zones encountered in the project have not been tested.

Moved East

In line with lease commitments, Jones then moved about five miles east of the original discovery well and drilled Cuban Juanita No. 1 to 4400 feet in limestone and shale.

Testing and other equipment was not immediately available, so Jones moved from the Juanita No. 1 back to the Thomas Bess concession and began Jones No. 3. Drilling of this well was punctuated by a number of gas blowouts.

Jones revealed that before completing No. 3, a deal was made with Cuban Kewanee Oil for the Thomas Bess concession, including Jones No. 1 and No. 2, with Cuban Kewanee to finish Jones No. 3, and the Jones interests retaining a substantial override of all production.

Cuban Kewanee, under terms of the contract, is to continue development of the 2000-acre Thomas Bess property.

It was recounted that since taking over the concession, Cuban Kewanee has completed Jones No. 4, No. 5, No. 6 and No. 7 as producers. CK drilled Jones No. 8 to some 6500 feet and hit a zone that compared favorably with the zone penetrated in Cuban Juanita No. 1 at 6100 feet.

High Pressure

Because of mechanical difficulties and high gas pressure 3000 feet of drill pipe and collars were lost. It was not possible to recover the fish with the results the hole was abandoned.

Jones No. 9, located about one mile east of the original Jones discovery, was drilled to approximately 3000 feet. It is not yet known whether Cuban Kewanee will deepen this well or abandon it. Jones No. 10 was started but the rotary rig was moved because of lost circulation. United Cuban has been advised that CK plan to install cable tools and continue the drilling of No. 10.

At last reports Cuban Kewanee was operating on the Thomas Bess concession with two National T-32 rigs which are drilling Jones No. 11 and Jones No. 12 and have indicated that they will bring in a third rig.

Following the sale to CK, Jones transferred his equipment back to Cuban Juanita No. 1, five miles east of the original Jones find. The hole was taken on down to 6247 feet.

Possible Pays

A number of possible pays evidently were encountered with the best zone indicated from 6100 to 6160 feet. Due to extreme gas pressures and the fact that the 6½-hole had to be made through 7-inch casing, that had been set in the upper portion, some 400 feet of drill pipe and drill collar was lost.

After giving considerable time in an effort to complete the lower zone,

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The application of the hard metal with the new method is done by an automatic electric welding machine utilizing an inert arc process. Using a non-consumable electrode, an electric arc melts the tool joint steel into a puddle at the proper spot. Hard metal grains are fed into the puddle automatically. The arc is shielded by a continuous flow of inert gas to prevent contamination or oxidation of the steel during the melting process.

Unretouched photo of Inarclad cross section sample.

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1. **Inarclad uses the high alloy steel of the tool joint itself as the binder for the hard metal.**
2. **The steel of the tool joint will not become oxidized by the heat of the weld because the arc is operating in an inert atmosphere.**
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7. **The hard metal is applied to the tool joint without recessing and results in a slight surface build up. This build up equals approximately 1/32 in., which increases the tool joint O.D. about 1/16 in. The O.D. of the tool joint remaining after all the hard metal has worn away is 1/16 in. larger than it would be if the same bands had been laid in recesses.**

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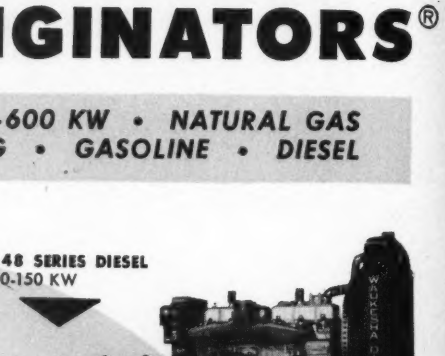

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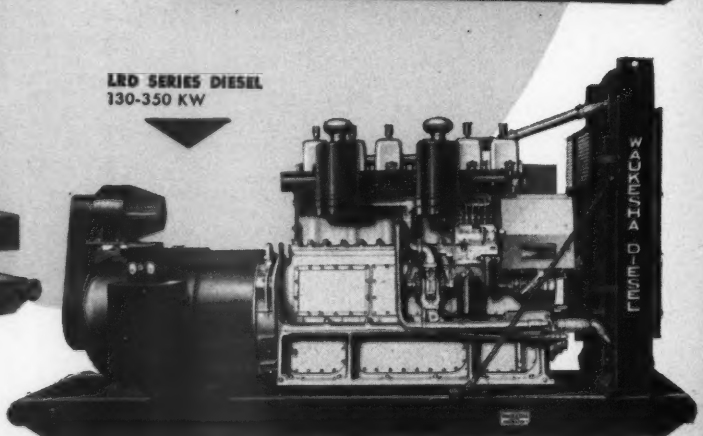

323

WRITE FOR BULLETINS FOR THESE AND OTHER MODELS.

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decision was made to complete the upper zone from 1050 to 2250 feet as a low gravity oil producer in sandy lime. This qualified as the second wildcat discovery for the Jones interests in Cuba.

All sedimentary formation with the exception of two small serpentine fingers of approximately 30 feet each, Cuban Juanita No. 1 is believed to have opened up a much larger area and has one of the best zones that so far has been encountered on the island.

Although the oil from the upper zone is heavy gravity there is a ready market for it. The well was completed flowing through 5-inch casing with no tubing set. Additional perforations were made in the production zone and this move is expected to boost output.

New Location

Location for Cuban Juanita No. 2 has been staked 330 feet due west of Juanita No. 1. Plans are to core all of the zones found in No. 1 and to test the 6100-6160-foot zone picked up by No. 1.

Some 8000 feet of 2 7/8-inch drill pipe has been purchased and drilling may go to 7500 feet if the bottom zone in Cuban Juanita No. 2 proves to be less than it is anticipated at this writing.

It is thought that deeper sands, from 7500 to 10,000 feet, offer good possibilities. However, United Cuban will endeavor to develop production in the upper zones before drilling a deep test.

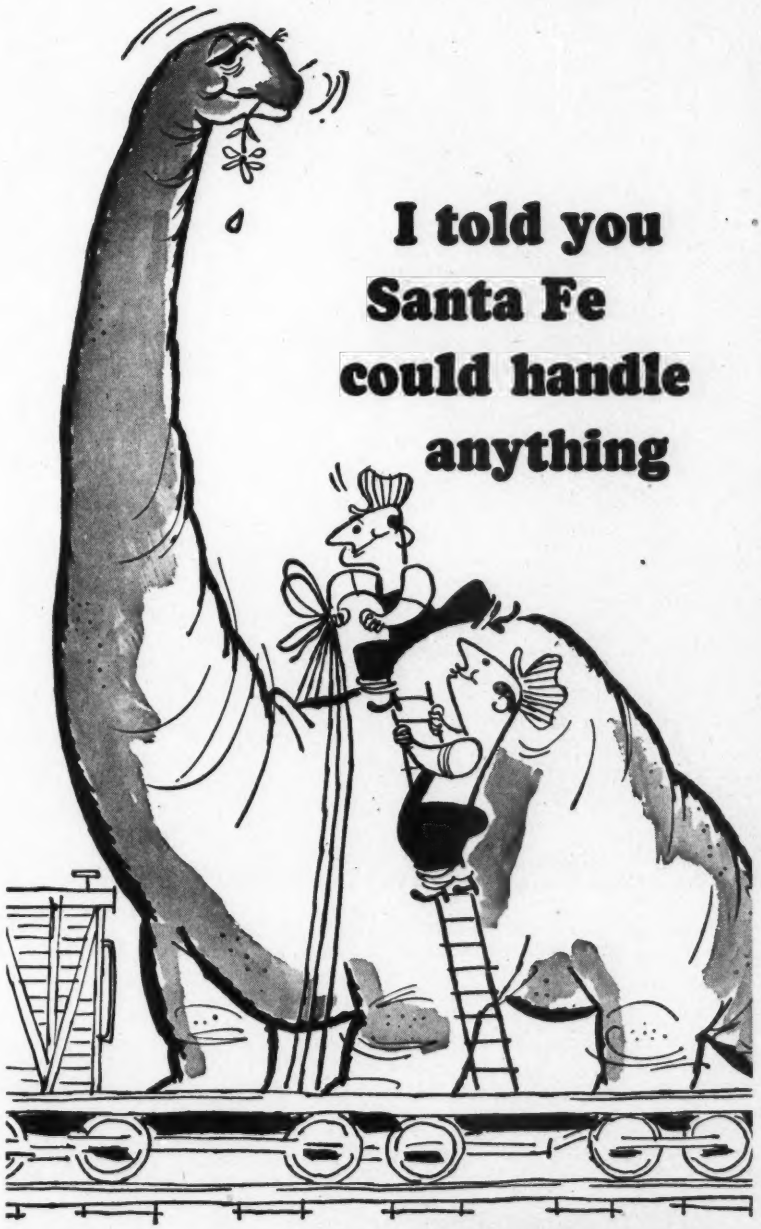
Additional mud tanks and another pump has already been annexed to the Cuban equipment and set up on location No. 2. The rig has been moved from Cuban Juanita No. 1 and Juanita No. 2 is under way.

United Cuban plans moving in an additional rig from Los Angeles, which will be used to develop the shallow zones, while the present rig in Cuba will be used to dig the deeper wells.

It was explained that funds obtained from the sale of United Cuban stock will be used to develop the Cuban properties and the company's leases in New Mexico.

United Cuban is maintaining its own geological office in Cuba. An engineering and geological staff is headquartered there.

The principal office is 9100 Sunset boulevard, Los Angeles.



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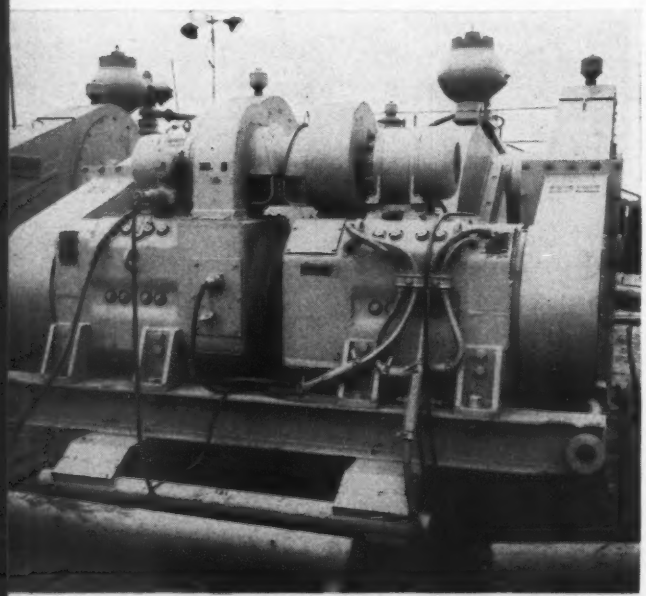
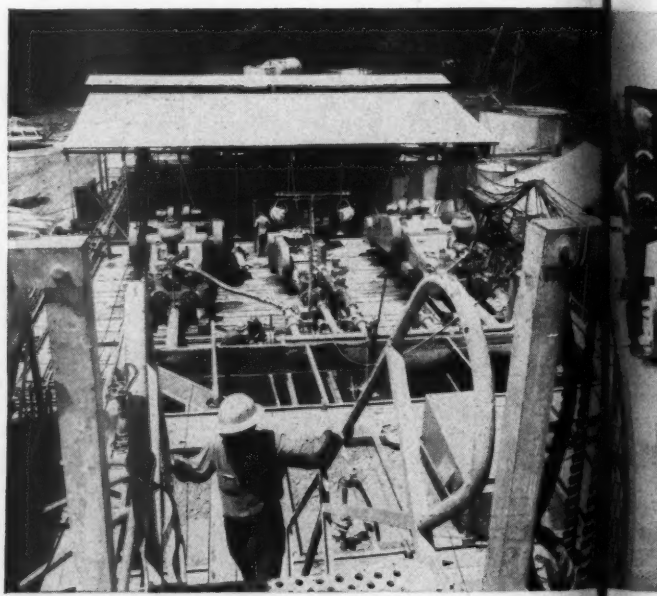
Three skid-mounted Electro-Motive Diesel generating sets rated at 875-hp. supply power for motor driven pumps, rotary table and draw works. Each unit is complete with two 500-kw generators, controls and cooling system.



Drive motors are 625-hp. direct current type for smooth, rapid acceleration of loads and positive control of speed and torque. Each main pump has two 625-hp. motors for a total horsepower rating of 1,250.



Simple, flexible conductors connect generating sets to drive motors, allowing complete flexibility of arrangement. Rig-up time is reduced considerably because components are located to fit the site.

It's Diesel-Electric for Shell on Cote Blanche Island

Portable, rapid-setup Electro-Motive Power choice for big rig in rugged Louisiana swamp

To work the swampy Cote Blanche Island field, Shell Oil Company faced two opposing requirements for their Rig 11. First, the rig had to be big, with power to drill over 18,000 feet. And second, it had to be easily portable to enable movement over primitive roads.

Shell's decision to use Diesel-Electric was influenced by the fact that this type power permits gathering almost all equipment into easy-handling, skid-mounted packages. In spite of rough terrain, rig-up can be completed in record time.

Electric conductors running from generating units to drive motors provide flexibility in locating equipment to suit conditions. This design avoids clutter, reduces rig-up and rig-down time and makes a big rig far more economical to move. Also, with few modifications, equipment can be adapted for offshore drilling.

Three Electro-Motive SR-8, 875-hp. Diesel generating units driving nine 625-hp. d.c. motors provide the drilling power for Rig 11. Its first hole is scheduled for 18,500 feet, using a 14,000 foot, 9⅝ in. protective string. It takes big power to drill below the overhang of the salt dome in this area, and this rig has it.

Electro-Motive Power is adaptable to many different types of drilling devices on land or water. For complete details on how it might fit your own particular requirements, get in touch with your Electro-Motive representative.

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Driller's control is located next to draw works. From a central position, driller has complete control of Diesel-Electric equipment, including engine speed, pumps, hoist, rotary table and safety shutdown.

Derrick on Rig 11 is a big one—147 feet. It was modified for platform drilling, but can be extended to 189 feet. In spite of size, the rig is highly portable. Skid-mounted equipment gathers into easy-handling packages.

RADIOLOGICAL SAFETY IN THE PETROLEUM INDUSTRY

B. A. Fries
California Research Corp., Richmond, Calif.

ABSTRACT

Radioactive tracers and radiation sources are put to increasing use in the petroleum industry. These are relatively new materials to this industry, and they pose a new type of safety problem. The principles of radiation protection are already well known, therefore, the petroleum industry need only adapt these principles to its own specific uses.

Some examples of uses of radioactivity in petroleum technology are given. The nature of radiation hazards, safe working radiation levels, and means for radiological protection are considered. Safe working procedures are illustrated in some practical plant applications of radioactivity.

Three pertinent questions arise in the discussion of radiological safety in the petroleum industry:

1. What is the relationship between "radiology" and the petroleum industry?
2. What and how serious are the hazards found in this relationship?
3. How is work safely carried out in the presence of these hazards?

These questions will be considered in turn.

First, the petroleum industry, with the exception of the nuclear industry itself, has led all others in applications of radioactivity and radiation to its technological problems. Radium and uranium were used when only natural radioactivity was known. The development of high energy accelerators and nuclear reactors added a wide variety of artificially produced radioisotopes. These tools have been applied in every phase of petroleum technology.

Second, the petroleum industry must deal with a new type of safety problem. This radiological problem is more obscure than many other safety problems. None of our five senses can directly perceive radiation. Yet, physiological damage is produced by the interaction between living tissue and large doses of high energy radiation, such as X-rays and gamma rays or high energy particles, such as electrons, beta rays, and neutrons.

Third, the principles of radiological protection are well known, therefore, methods are available for coping with these very real hazards. A remarkable record of radiological safety has been achieved in the atomic energy industry, itself. The petroleum industry deals with radioactivity many orders magnitude less than the radioactivity in the atomic energy industry. Our problem is easier. With good safety practices and at reasonable cost, we can continue to employ and expand the uses of radioactivity in the technical progress of our industry.

Applications of Radioactivity and Radiation

The petroleum industry uses radioisotopes and nuclear radiations extensively in its many activities.[1,2] They play a role in the search for oil, in the refining and transportation of products, and in the research laboratory. Some uses require small amounts of radioactivity with minimal safety requirements; others require large amounts with appropriately increased care.

In oil field exploration, neutron sources containing up to 100 mc of radium are used in well logging. In field studies, the movement of gases underground has been traced with tritium and radiokrypton. Underground water movement in water studies has been traced with radioiodine. A number of well completion operations, such as acidizing, squeeze cement tracing, and lost circulation location employ radiotracers.

A large number of refining operations are followed, checked, or controlled by radioactivity methods which require only a few millicuries of tracer. Some of these are:

1. Measurement of circulation rate of catalyst beads in Thermofor catalytic cracking and Houdriflow catalytic cracking plants.
2. Measurement of mixing and losses of catalyst in fluid catalytic cracking plant.
3. Measurement of entrainment in distillation and scrubbing columns.
4. Measurement of mixing and segregation of liquid stocks.
5. Measurement of gas and liquid flow rates.
6. Leak testing.
7. Level gauging of liquids and solids.
8. Pipeline interface marking.

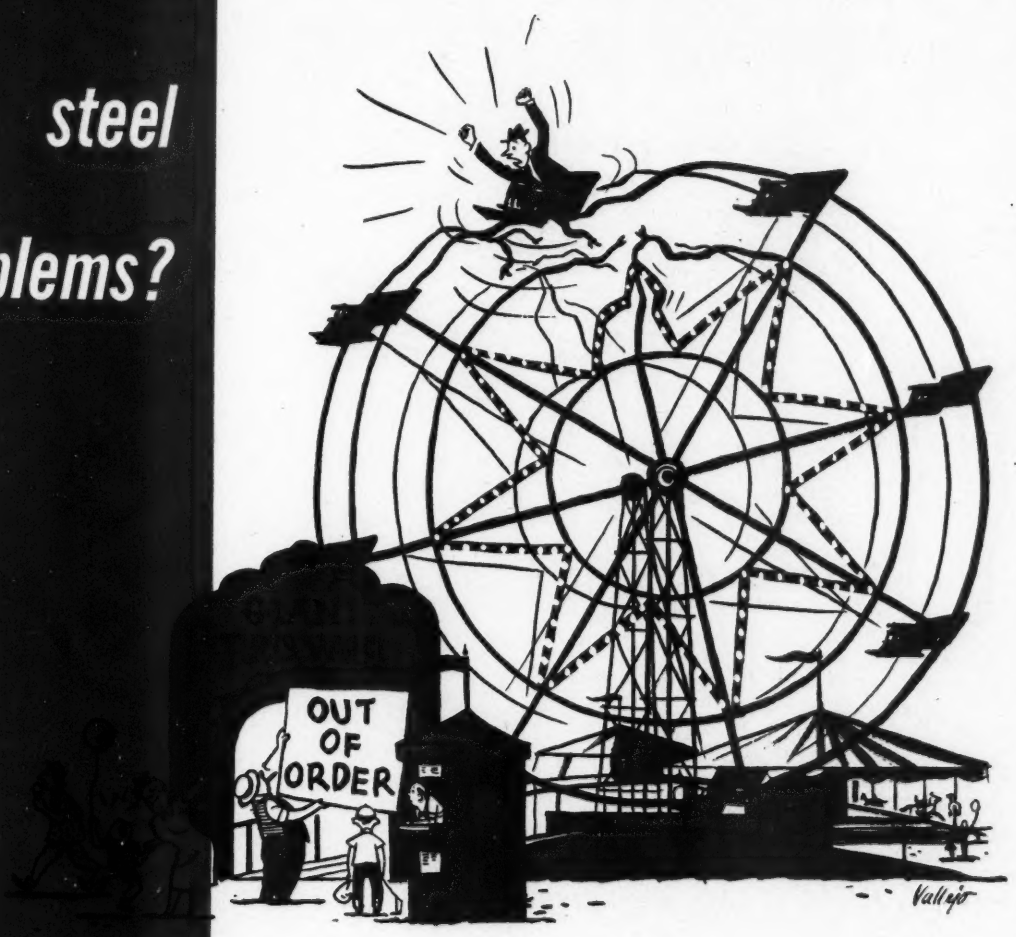
In the research laboratory, radiation sources and radiotracers also find wide use. The chemist uses them to trace the course and to measure the kinetics of chemical reactions. The analyst has learned to use them for rapid and simple chemical analyses. The engineer uses radioactive engine parts to measure wear and deposit formation. There is currently great excitement in the field of "refining by radiation." Many companies are now studying the effects of nuclear radiations on petroleum materials and products. These studies require great sources of radiation, either kilocuries of radioisotopes or high energy particle accelerators whose outputs are equivalent to hundreds of kilocuries of radiation.

The Radiation Hazard

There are two distinct types of radiation hazard—the external hazard, in which the whole or part of the body is irradiated by a source outside the body; the internal hazard, in which a radioactive substance enters the body through the mouth, lungs, or skin and produces injury.

In acute exposures of the whole body to large external doses, the clinical effects are mainly injury to the blood-forming tissues and the intestinal tracts. These tissues are

steel problems?



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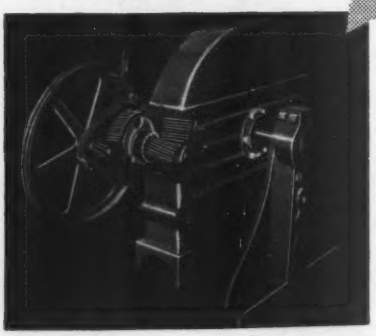

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very sensitive, but they have considerable recovery power. The median lethal dose LD_{50} in man is 400 to 600 roentgens (r). These acute lethal doses are not possible in most industrial applications. The exceptions may be in the irradiation of materials with kilocurie sources or radiation machines. Exposures at relatively low levels over a long period of time may result in delayed effects, such as leukemia, skin cancer, and shortening of the life span. Life shortening may result from factors other than those caused by damage to specific tissues. These general factors are lowered immunity, damage to connective tissue, or premature aging. Among those working and adhering to present permissible levels, no effects have been detected. This situation should apply to workers in the petroleum industry.

In injury from internal radiation, the organ most likely to be affected is the one in which the radioactive material concentrates most. Strontium, radium, and plutonium are "bone seekers." Iodine concentrates in the thyroid gland. Hence, radioactive substances vary greatly in toxicity, depending upon biological factors, such as absorption, retention, and concentration in specific tissues, and physical factors, such as energy, half-life,and type of radiation.

Radiation Regulations

Radiation injury is extremely serious, and effective therapy usually does not exist. Hence, radiation protection is concerned essentially with the prevention of injury. To implement this, a code of conduct has been drawn up which sets conditions for safe work with radioactivity and radiation.

The first efforts at radiation protection were set up by the British Roentgen Society in 1915. In 1928 an International Committee was organized. In 1934 this committee first suggested the "tolerance dose."[3] During the last war, when work with radioactivity became an industry, the Manhattan Project set up exposure limits quite similar to those established in 1934. By and large, these figures are still retained; and the latest official revision of standards for protection against radiation established by the Atomic Energy Commission in 1955 uses the same dose limits.[4]

Basically, these regulations allow an occupational exposure for external radiation of 0.3 r in any week, but with exceptions up to 3 r in any three-month period. Further restrictions to doses integrated over longer periods extending to the whole working lifetime and to a large segment of the population must be anticipated. This is so in the latter case because reproductive germ cells may propagate radiation injuries from generation to generation. A first step in this direction is found in the June 1956 report of the National Academy of Sciences.[5] They hold that **any** additional radiation above the natural background is genetically undesirable. They recommend restrictions, such that members of the general public receive no more than 10 r in addition to background (about 4 r) from conception to age 30 and that individual persons receive not more

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than 50 r to the reproductive cells up to age 30 and not more than an additional 50 r up to age 40.

Other regulations deal with maximum permissible levels of radioisotopes in air and water for protection of workers and the general public against internal hazards. Table I, which we post in our laboratories, is an abbreviated form of several AEC regulations.[6]

Protection from External Radiation

With external radiation, we are dealing principally with gamma rays and to only a limited extent with beta rays. There is a considerable variety of radiation monitoring instruments by means of which we determine the radiation level from sources and establish the needs for radiation protection. Geiger counters, scintillation and ion chamber detectors are commonly used. There are three principles—distance, time, and shielding—which we employ either singly or in combination to effect the required protection. The area survey meters are used to map out fields of radiation to establish safe working times within the fields and to establish shielding needs. Besides these instruments, there are personnel monitors, such as pocket dosimeters and film badges. These are used to provide direct checks on actual exposures.

Tolerance limits are set at 300 milliroentgens (mr) per week. On an 8-hour day, 5-day week basis, tolerance is 7.5 mr per hour. We must stay below this quantity; we prefer it to be as low as possible. Where space and time are not important criteria, distance can be used as the simplest and cheapest form of protection. We take advantages of the radiation square law. In practice, distance between the operator and the source of radiation may be achieved through use of long-handled tools or in a much more elaborate style by the use of remote control equipment. Time is another principle which can be used with great flexibility. From measurement of radiation levels, the time necessary for completion of the job can be estimated and the working time so restricted as to remain within the tolerance limits.

IT'S A FACT:

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and tightness is important to you

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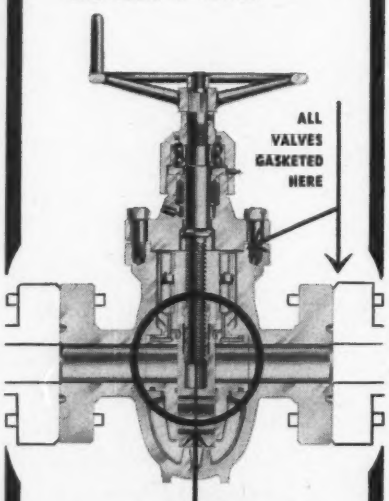

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When space is at a premium or radiation levels are so high as to limit working time to very short periods, biological shielding becomes necessary. Lead, iron, and concrete are generally used for these shields. Temporary shields may be constructed for specific jobs. Other jobs may require elaborate permanent shields.

The "hot laboratory" is a facility where all these principles can be used and their uses properly coordinated. Such a laboratory is usualiy required for tracer work in quantities above a few millicuries. The hot lab is a permanent structure making use of permanent shielding and providing work and storage facilities. The structure may be simple or complex, depending upon the nature of the work. It may contain very expensive equipment, such as master-slave remote manipulators and special leaded glass windows for viewing.

After work is under way, we must make sure that we remain within our radiation exposure limits. For this, we use our personnel monitors. If we wish to monitor our exposure following a particular operation, we read this directly off a self-reading dosimeter. If we suspect that a particular step in the operation is responsible for the greatest amount of exposure, we can read the dosimeter immediately before and after this step to find the net exposure. If we believe that there will be an appreciable exposure to the hands, we strap a dosimeter to the wrist as well as wearing one on the body (shirt pocket). By direct observation of our exposures, we can immediately correct procedures that are carried out without sufficient protection.

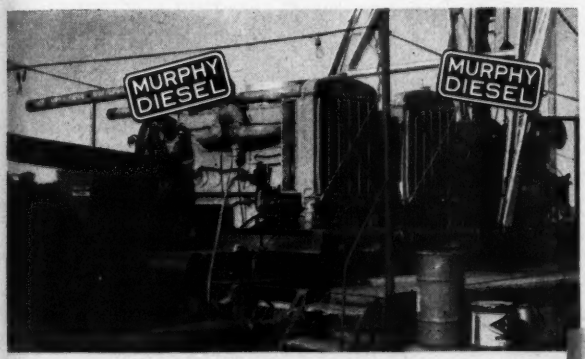
Such immediate control cannot be achieved by the use of film badges. The badge is generally worn for a week at a time, then must be returned for film processing and evaluation. The exposure may not be known for some two weeks after it has occurred. Then it may be difficult to recall the circumstances of the exposure. There are several other disadvantages to the film badge. It is energy dependent; that is, sensitivity varies greatly with energy. Development of the film is critical. The film density depends

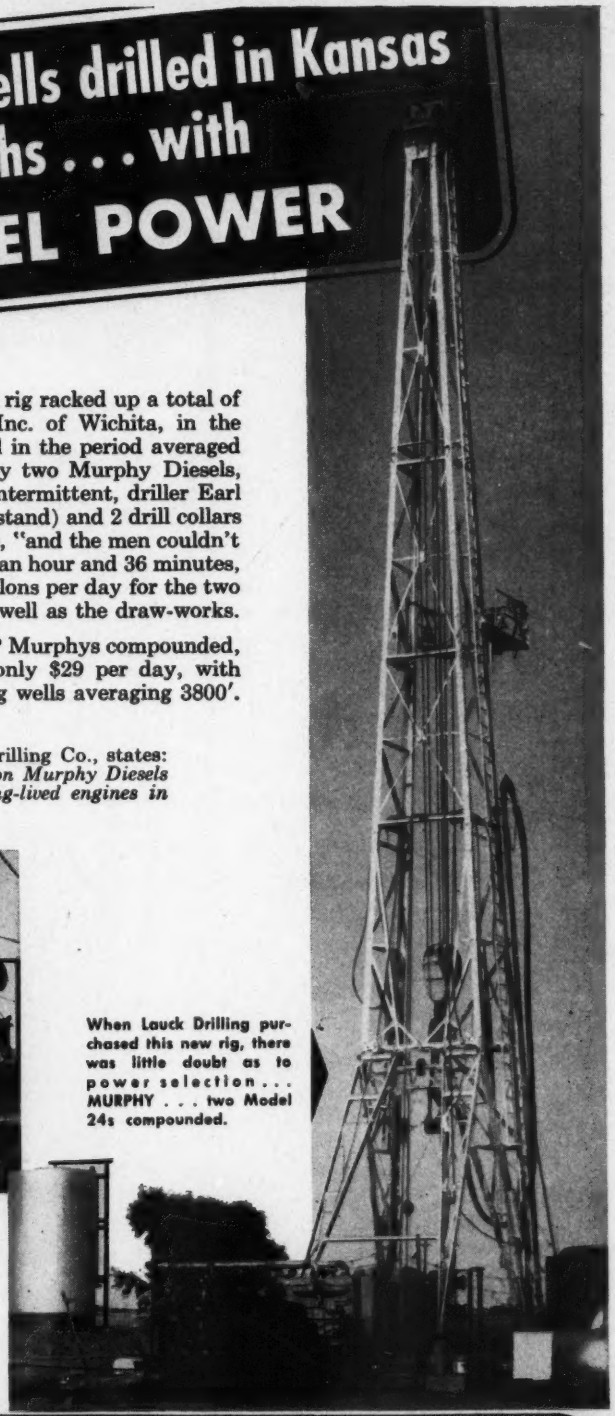
SIX 3600′ to 3800′ wells drilled in Kansas in TWO months . . . with MURPHY DIESEL POWER

From April 18 to June 21, this Murphy-powered rig racked up a total of 20,305′ of hole for Lauck Drilling Company, Inc. of Wichita, in the Great Bend, Kansas, fields. The six wells drilled in the period averaged between 3600′ and 3800′. On #2 rig, powered by two Murphy Diesels, each rated at 198 HP continuous and 213 HP intermittent, driller Earl Lundblade pulled 34 stands of 4½″ pipe (60′ per stand) and 2 drill collars in 27 minutes. "Any faster," says Mr. Lundblade, "and the men couldn't keep up." He also made round trip from 3120′ in an hour and 36 minutes, using 4½″ drill pipe. Fuel costs ran about 300 gallons per day for the two Murphys, which power the 7½″ x 14″ pump as well as the draw-works.

On an older Lauck rig, powered by two 193 HP Murphys compounded, fuel costs over an 18 month period averaged only $29 per day, with diesel fuel costing around 13¢ per gallon, drilling wells averaging 3800′.

Clyde Merckle, Vice President of Lauck Drilling Co., states: *"After 21 years in the oil fields, in my opinion Murphy Diesels are the most economical, dependable and long-lived engines in the drilling industry."*





When Lauck Drilling purchased this new rig, there was little doubt as to power selection . . . MURPHY . . . two Model 24s compounded.

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on the particular developer, temperature, exhaustion through use, time, agitation, fading after development, etc. It is, therefore, necessary to develop control films along with the unknowns.

Our own practice with self-reading dosimeters is to have the individual user record the initial, final, and net readings. He also records the date and signs his name for these data, which are then kept as permanent company records. A high reading can readily be spotted by the supervisor and corrective measures taken. A few dosimeters will serve a large number of workers, while those who work with radioactivity frequently are provided with their own instrument.

Protection from Internal Radiation

Radiation "asepsis" is the condition for protection from the internal hazard. Spread of contamination on surfaces and in the air must be avoided. To avoid the absorption of minute amounts of beta- and alpha-emitting isotopes, the worker may wear rubber gloves, a breathing mask, and carry out the work in a fume hood. An alternate method is to carry out the work completely within an enclosed container. This is commonly called a "glove box." Here the radioactivity is totally confined at all times. All the operations are carried out within the box through glove ports. When necessary, shielded boxes may be used.

The amount and specific nature of the radioactivity determine the extent of the precautions. For example, working with carbon-14 is not particularly hazardous. The total body tolerance, which is the maximum amount that may be permanently fixed in the body, is 250 microcuries for carbon-14. Work with strontium-90 is extremely hazardous. For this isotope, the total body tolerance is only one microcurie. Our laboratory safety reminders, shown in Table II, point out a number of precautions that we follow to avoid internal contamination.

Waste Disposal

The disposal of radioactive waste is one of the more perplexing aspects of work with radioactivity. On the scale of use in the petroleum industry, the disposal problem is not difficult. Proper planning can simplify the problem no matter what method of waste disposal we choose. Because most radioactivity is first received as a small physical unit, the ultimate volume of wastes is dependent upon the care taken in planning for a minimum increase in volume. Much disposal can actually be achieved by decay in storage.

Wastes may be disposed of by burial in the ground, burial in the ocean, or disposal in public sewers. Burial in the soil requires many special conditions. The area must be devoid of edible plant life, the activity must not leach from the soil, and the area must be marked and protected against unauthorized entry. Ocean burial is quite simple. Collected wastes are reduced in volume as much as possible; for example, by evaporation of excess liquid. The bottle or cartons of waste material are placed in steel barrels and covered with wet concrete mix so that the final bulk density of the barrel will insure sinking in the ocean. In our practice, we limit the radiation level of the outside surface of the barrel to 200 mr per hour of gamma rays to also satisfy ICC shipping regulations. The barrels are dropped in the ocean where the water is at least 1,000 fathoms deep.

Disposal into public sewers requires that the material be water soluble and that certain concentration limits be adhered to. These are: 100 mc per million gallons of sewage for isotopes with a half-life less than 30 days and 10 mc per million gallons for half-lives greater than 30 days. Some isotopes are more severely restricted. These dilutions refer to volumes of sewage in which the dilution is expected to occur. Dilutions of this order of magnitude are easy to reach but should be verified by calculation.

Radiation Safety Training

Responsibility for designing and safely conducting radioactive experiments belongs to a qualified expert on radioactivity. The task of carrying these tests, particularly routine ones, ultimately involves other technical and nontechnical personnel. These personnel must be trained on the job. In our practice, an expert discusses with these per-

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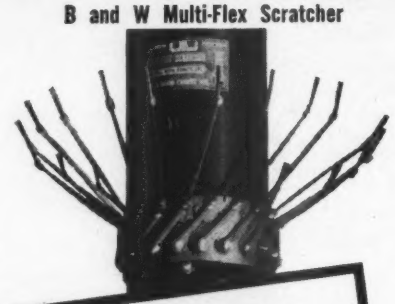

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sonnel the nature of the radiation problem and demonstrates the equipment employed for radiation protection. He supervises and participates in one or more of these tests with them until he is assured that they are reliably using safe practices. Radiation surveys of work areas are made periodically or whenever some new activity is carried out. Personnel exposure records are also examined. In this way, all radioactivity work is continually reviewed.

Examples of Radiation Safety Practice

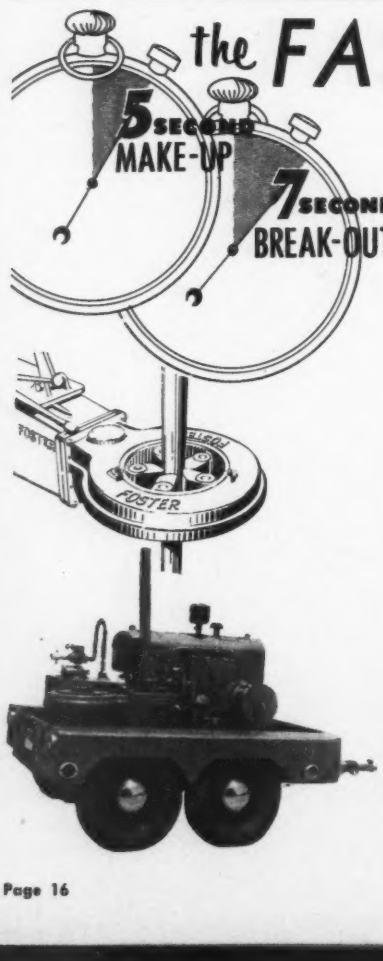
Most tracer experiments in petroleum technology are carried out with quantities from a few millicuries up to one curie. Very few require more than 10 millicuries. Laboratory tracer experiments usually require only a few microcuries. Irradiation of materials requires multicurie cobalt-60 sources or high energy accelerators.

There is no particular safety problem in laboratory tracer research because the quantity rarely exceeds a few microcuries. Here the problem is to avoid contamination which can spoil the experimental results. The use of powerful gamma ray and electron sources for irradiation purposes requires shielding and remote handling equipment. These facilities are generally incorporated as part of a hot laboratory.

The typical radioactive application in the refinery is a technical service test. Some of these have been mentioned earlier. These tests may require several millicuries in the field, although preparation of the tracer for the test may involve processing 100 mc or more in the hot laboratory. The actual experiments can usually be done without recourse to elaborate facilities. Tested equipment should be used, and small or partial shields should be installed when needed. A dry run, that is, practice without tracer, usually exposes weak points in the procedure so that safe techniques may be applied in the real test. Some of these points can be best illustrated by actual examples.

Tracing Fluid Catalysts

These studies were carried out to measure catalyst deactivation and mixing rates in the fluid cracking units. In mixing studies carried out by Shell Oil Company[7] the catalyst was tagged with up to 2 mc of scandium-46 and cerium-144. The hot catalyst was then mixed with about 850 tons of ordinary catalyst in the plant unit. Counting was done with the highly sensitive scintillation detector. The labeled catalyst was prepared in the research laboratory and was shipped to the refinery. It was added to the cracking unit by a trained radiochemist so that refinery operating personnel were not exposed. Radiation levels during the injection operation ranged from a few milliroentgens per hour to a few hundred milliroentgens per hour in these tests. But the time required was only a few minutes so that actual exposures were quite small. Shielding and long-handled tools were not needed. Once the radioactive catalyst was uniformly mixed with the total inventory, the external radiation level was negligible, about 0.01 mr per hour which is roughly equal



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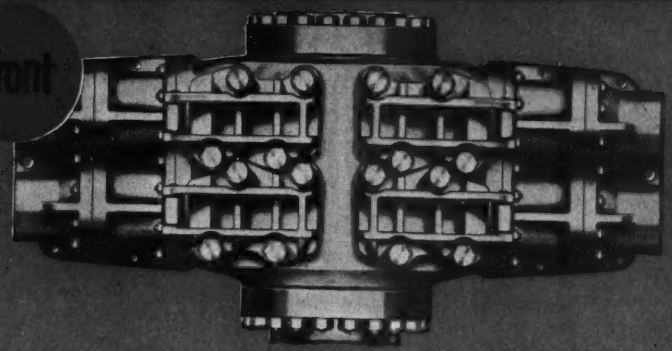
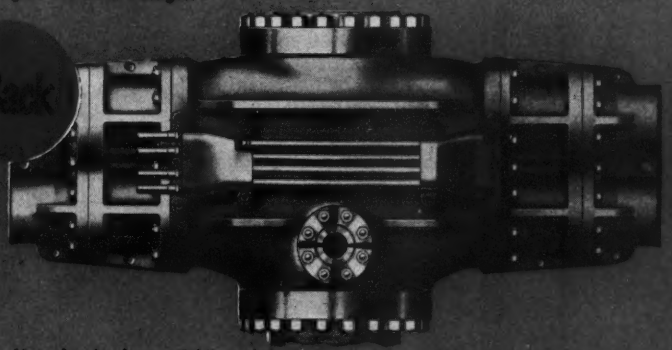
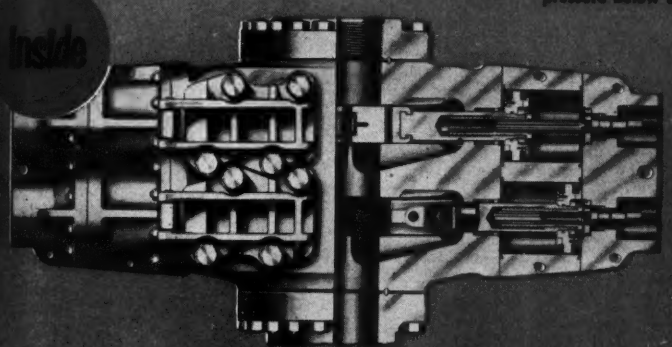


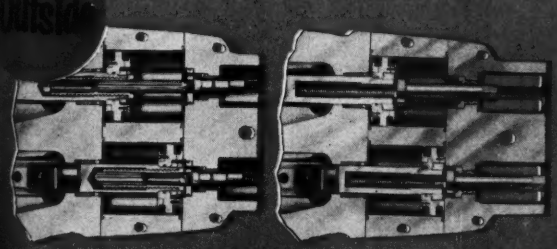
See these conveniently-located doors — a set for each ram compartment! Unbolt and swing them open and you can quickly change rams in either compartment whether the pipe is in or out of the hole. No need to allow extra space above the gate to make ram changes — nor must extra space be provided at the ends of the gate for these changes.



Note the simple manifolding of the hydraulic lines and the clean, clutter-free overall design. Even in sizes as large as 13⅝" (12" Series 900) total height is only 30" for the Double Gate, only 18½" for the Single Gate. Multiple outlets for quickly relieving pressure below each ram can be furnished, if desired.



No mud problems here. Note how the rams travel on high narrow guide ribs above the steeply-sloped compartment bottoms. No detrimental sand or mud can accumulate to interfere with quick, easy ram operation.



Do you prefer the greater compactness of a *Non-Rising* Locking Shaft (above left)? . . . Or the quick indication of ram position provided by a *Rising* Shaft (above right)? Take your choice — with Shaffer you can have whichever type you prefer!

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to the background level. For internal contamination by ingestion or inhalation, one would have to maintain steadily in his body several tons of catalyst to even reach the body tolerance level. In catalyst deactivation studies, where about 50 mc of tracer was used and stack losses were much greater, it was still necessary to ingest from 5 to 15 pounds of catalyst to reach body tolerance. The stack effluent concentrations were still below continuous breathing levels. Actually, most of the catalyst fines are not discharged to the atmosphere but are collected in precipitators. During this test, numerous air samples were collected and examined for radioactivity. In only a few cases was the radioactivity sufficiently high to be detected.

A similar study was carried out by The Texas Company[8] where the fluid catalyst was labeled with about 50 mc of cobalt-60. These investigators monitored the air in the vicinity of the stack for radioactivity with AEC air samplers. Although 1 mc of cobalt-60 left the stack during the first day, only traces could be detected in the samplers. This indicated very great dilution and little fall-out in any area.

Mixing in Crude Stills

An unusual batch of crude oil was to be refined through a battery of crude stills.[9] The refinery operators wished to segregate the tar from this crude as completely as possible from the tar ordinarily produced. By adding a tracer at the moment this special crude was run, the appearance of the tracer peak in the tar bottoms would indicate the logical moment for switching the special tar to a separate tank. For this test, 10 mc of cobalt-60 was used. The cobalt-60, diluted in a pint of thinner, was injected from a simple pressure vessel. The radiation level about 6 inches from the vessel at the valve location was about 400 mr per hour. Since the operation took only about 1 minute to complete, the exposure to the hands was only about 7 mr, well below tolerance exposure for the hands. The maximum concentration of radioactivity found in the tar bottoms was 5 counts per second, which was only about half the background rate. The total activity was ultimately passed out the stills in a volume of 3,000 bbl. This concentration was many times less than the allowable concentration of cobalt-60 for continuous drinking. Actually, one would have to drink 1.5 bbl. of this tar to reach the maximum permissible single intake. Since there would ultimately be further dilution with more tar in storage tanks, and since this was a single test and not a continuing contamination, safety requirements were amply satisfied.

Pipeline Interface Marking

For more than six years, a tracer method has been in use for marking interfaces between product shipments in the Salt Lake-Pasco Pipe Line.[10] Each time the Salt Lake pump station changes the product being pumped through the line, a few milliliters of tracer liquid containing about 2 mc of antimony-124 is injected into the line between the products. As the injunction of the two products moves along the line, the tracer flows along with it. At each point where products are delivered from the line to tankage and at the Pasco terminal, Geiger counters attached to the pipe report the tracer's arrival. This indica-

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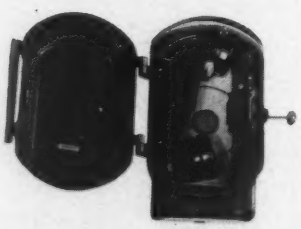

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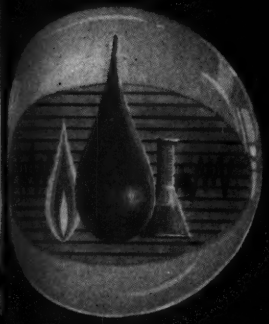

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tion provides the operators with information for switching the new stream of gasoline or oil to the proper tank.

What are the radiation safety problems in this operation? First, the tracer liquid must be prepared. For this, a few hundred millicuries of radioactive material is processed in the hot laboratory at Richmond, Calif., by trained technicians. The pipeline tracer is shipped to Salt Lake suitably packaged to satisfy ICC shipping regulations for radioactive materials. At Salt Lake, the tracer is transferred to a shielded storage container from which it is dispersed in 2-mc portions to mark the interfaces. All of these manipulations are carried out well within tolerances for external radiation.

Once in the pipeline, the radioactive material is so diluted that it can be detected only with highly sensitive instruments. The radiation dose at the surface of the pipe whenever a tracer wave goes by amounts to only 0.02 mr. Since the operation is done only once a day, this exposure is far below the 60 mr per day limit to anyone standing along the pipe. The activity in products is extremely low. In our practice, the mixed products in the interface zone are discarded into slop tanks. This takes with it the bulk of the tracer. When the interface is between gasoline cuts, the tracer is diluted into tankage volume of the order of 10,000 bbl. At this concentration, one must drink 25 bbl. of gasoline at once to reach the maximum permissible single intake. Accumulations of radioactivity in automobile engines has been investigated. The activity found in an automobile run exclusively on this gasoline was only about 25 per cent of the background rate.

Grease Mixing

The efficiency of several grease mixing vessels was evaluated at the Baltimore Refinery of Esso Standard Oil Company.[11] An oil-soluble radioisotope was added to the top of each vessel. As the tracer was mixed, the count rate on a scintillation detector outside the vessel gradually approached a constant value. At this point mixing was complete. Safe disposal of radioactivity from the commercial grease was accomplished in this test by using a short-lived isotope, iodine-132, which has a half-life of only 2.3 hours. This isotope is the daughter of 77-hour tellurium-132. The radioiodine can be separated every few hours from the parent. In this way, a supply of iodine-132 could be kept on hand for a week or more. In these tests, it was possible to release the grease for sale within 24 to 48 hours after the tracer was added because of its rapid decay.

TABLE 1

Maximum Permissible Quantities of Radioisotopes, Microcuries

Isotope	TBT*	MPSI†	AEQ‡	Per ml Air	Per ml H_2O
C-14	250	140	50-50	1.4×10^{-6}	3.6×10^{-4}
Ca-45	65	89	10-10	9×10^{-8}	5×10^{-5}
Ce-144	5	5	1-10	2×10^{-8}	3.6×10^{-3}
Co-60	3	5	1-10	3.4×10^{-6}	1.8×10^{-3}
Cs-134	90	13	...	3×10^{-9}	1×20^{-8}
Cs-137	90	13	1-10	6×10^{-7}	1.5×10^{-4}
Fe-55	1,000	840	50-50	1.8×10^{-6}	4×10^{-4}
Fe-59	11	10	1-10	5×10^{-8}	1.1×10^{-5}
H-3	10,000	1,300	250-250	7×10^{-5}	1.6×10^{-2}
Kr-85	100	100	...	3×10^{-9}	1×10^{-6}
Na-22	55	9	10-10	3×10^{-9}	1×10^{-6}
Nb-95	90	15	10-10	1.3×10^{-6}	4×10^{-4}
Ni-63	110	6	1-10	3×10^{-9}	1×10^{-6}
P-32	10	12	10-10	4×10^{-7}	2×10^{-5}
Po-210	0.02	0.07	0.1-1	2×10^{-10}	.....
Ra-226	0.1	...	...	2.4×10^{-11}	4×10^{-9}
S-35	100	140	50-50	3×10^{-6}	5×10^{-4}
Sb-124	28	5	1-10	3×10^{-9}	1×10^{-6}
Se-75	10	...	...	3×10^{-9}	1×10^{-6}
Sr-89	2	14	1-10	6×10^{-8}	7×10^{-6}
Sr-90	1	8	0.1-1	6×10^{-10}	8×10^{-8}
Tl-204	180	16	50-50	3×10^{-9}	1×10^{-6}
Zr-95	10	...	...	3×10^{-9}	1×10^{-6}

*TBT—Total Body Tolerance.
†MPSI—Maximum Permissible Single Intake.
‡AEQ—Authorization-Exempt Quantity, Unsealed-Sealed.

TABLE 2

Radiation and Radioactivity Laboratory Safety Reminders

Where Ionizing Radiation Exceeds 7.5 mr Per Hour

1. Wear radiation dosimeter and record exposure.
2. Maximum allowable exposure is 300 mr per week.
3. Report any case of overexposure to the radiological safety officer.
4. Monitor shipping containers and storage vault when materials are received or transferred.

Where Radioactive Materials Are Present in Unsealed Containers:

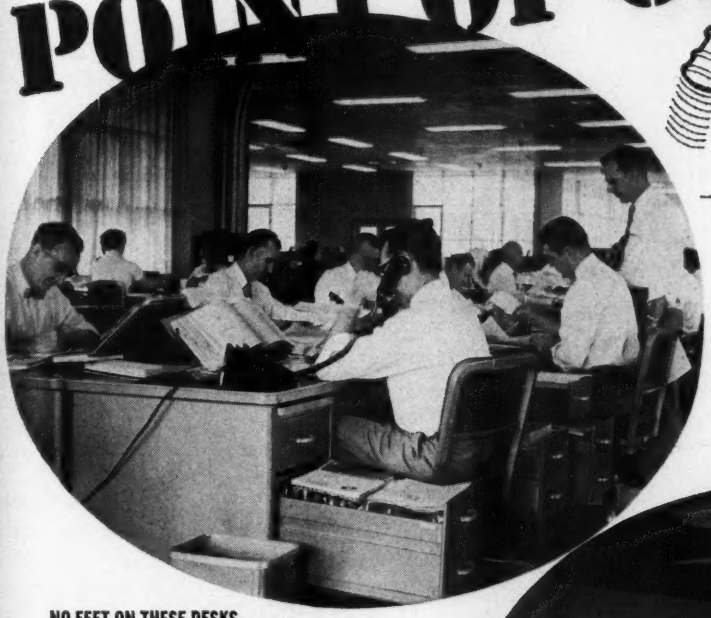
a. In quantity above maximum permissible single intake,
b. In specific activity above 10 microcuries per gram, and
c. In concentration above 10 microcuries per kilogram.

5. Do not smoke, eat, or drink in this room.
6. Post warning sign where materials are used.
7. Monitor air while working with materials which may give rise to dust, spray, or vapor.
8. Check hands and tools for contamination constantly when working with unsealed materials.
9. Clean up promptly any contamination above 1 mr per hour on skin, clothing, benches, or floor and report to radiological safety officer.
10. Label and store in vault materials not in use.

Conclusions

Radiological safety problems encountered in the petroleum industry are similar to those found in application of radioactive techniques by other industries. Actually, the uses of radioactive methods in our industry are so broad as to encompass nearly all uses. These applications have not posed any unique safety problems. The principles of radiation safety are known

POINT OF ORDER...



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†Presented to a medical and health session during the 36th Annual Meeting of the American Petroleum Inst., in the Conrad Hilton Hotel, Chicago, Ill., Nov. 12, 1956; presiding, David T. Staples, chairman, API Medical and Health Committee, president, Tidewater Oil Co., San Francisco, Calif.

Continental and Emsco Consolidate

J. L. Mauthe, Chairman of the Board of Youngstown Sheet and Tube Company announced that effective January 1, 1957, the businesses conducted by Continental Supply Company and Emsco Manufacturing Company would be consolidated and thereafter operated as Continental-Emsco Company, a division of the Youngstown Sheet and Tube Company. Mr. Mauthe also announced the election of Frederick M. Mayer as a vice president of the Youngstown Sheet and Tube Company and president of Continental-Emsco Company. In the combined Continental-Emsco Company, William T. Powell will be executive vice president in charge of manufacturing and engineering, and Frank L. Brinegar will be executive vice president in charge of distribution.

The following vice presidents of Emsco and Continental, W. C. Kinder, D. M. Bailey and Raleigh Hortenstine, Jr., will continue as vice presidents of Continental-Emsco Company. In addition, J. A. Mussler will be appointed a vice president and will be in charge of all tubular sales (steel, aluminum and plastic), as well as all pipeline equipment. Mr. Kinder will be in charge of machinery and allied sales.

Continental was organized in 1912 to serve the oil industry. During the first year it opened and stocked 14 stores at locations which would make its merchandise easily accessible to oil field operators. As the oil industry grew, so did Continental. Today it operates 70 stores in the United States, seven in Canada and two in Venezuela. It has sales representatives in Mexico, throughout South America, Europe and North Africa. Emsco was organized in 1923 and majority ownership of the Company was acquired by the Youngstown Sheet and Tube Company in 1938. It manufactures a wide range of oil well drilling and production equipment distributed by Continental Supply Company and others. On October 31, 1956, the Youngstown Sheet and Tube Company acquired the assets of Emsco preparatory to the consolidation with Continental Supply Company.

Food Machinery Buys O-C-T

An agreement whereby the outstanding shares of the Oil Center Tool Company of Houston will be acquired by the Food Machinery Corporation of San Jose, California has been announced by John F. Maher, O-C-T president. The agreement is subject to the approval of public agencies.

By virtue of the fact Food Machinery will exchange 90,000 shares of its stock, currently valued at nearly $6,000,000 for the outstanding shares of O-C-T, Mr. Maher will become the largest individual stockholder in Food Machinery Corporation. He owns approximately 60 per cent of the outstanding O-C-T stock.

Mr. Maher is to remain as president of O-C-T, which is a leading producer of Christmas Trees and other well control equipment for the oil industry. He said there will be no changes in personnel or operating policies when the acquisition is finalized.

O-C-T has more than 250 employees and its main plant in Houston occupies more than 55,000 square feet of floor space. The plant is on a 13½ acre tract at 1912 Airline Road.

Mr. Maher assumed control of the 28 year old company in 1946 when its annual sales amounted to $1 million. The company, under his direction, has enjoyed tremendous growth in both the size of its operations and income. Current annual sales are now running between $8 and $10 million, Maher said. His other business interests include Thermal Research and Engineering Corp. of which he is a major stockholder and director.

O-C-T has pioneered many new pieces and types of oilfield equipment under the direction of Mr. Maher, including the first 30,000 pound test Christmas Tree.

Mr. Maher was born in New Orleans and attended Ferrell's Military Institute, Washington and Lee and Tulane Universities. Prior to becoming president of O-C-T, he was owner of John Maher & Company, a chemical and oil well supply firm.

His interests range from horses to arts and literature. He is a member of the Metropolitan Club in New York; International House, New Orleans; and the Petroleum, Bayou and Houston Clubs in Houston.

Oil Center Tool, through 22 branches, operates in all oil and gas producing sections in the U.S. and Canada and is a major exporter of well control equipment to South America and other foreign countries.

Shafter Wildcat Drilling Steadily

Geochemical Surveys, Inc., is moving ahead with the drill toward objective depth of 7500 feet with its McWilliams No. 85-23 wildcat test in the Shafter area of Kern County. Contractor is Miller & York.

Field Development

Tulare Lake Test Going 11,000 Ft.

Western Gulf Oil Company is preparing to drill its Boswell No. 1 deep test on Section 24-21s-21e in the Cross Creek area in Kings County. The project, located close to the northwesterly limits of dry Tulare Lake, will look for the Eocene in going to a scheduled 11,000 feet. U.S. Drilling Company will do the work under contract.

Cuyama Valley Test Redrilling

Richfield Oil Corporation's F. K. Perkins No. 84-28 wildcat on Section 28-10n-26w in the Santa Barbara County part of Cuyama Valley is redrilling at 8000 feet. The well was taken originally to 10,229 feet. Southeast of the South Cuyama field by seven miles on wildcat ground, Universal Consolidated Oil Company has abandoned its Honolulu-Humble No. 3-21.

Tejon Ranch Well Finaled

Completed for 18 barrels of 54.6 gravity oil a day, cutting 54.6 per cent, along with 362,000 cubic feet of gas was the initial report on Richfield Oil Corporation's new Tejon A No. 1 test on Section 32-11n-19w in the Tejon Ranch area. The project was taken the first time to 7659 feet and then redrilled to 7958 feet.

Gatchell Zone Now Unitized

Unitization of the Gatchell zone of the Polvadero pool adjacent to the Guijarral Hills field in Fresno County has gone into effect. This was announced by Union Oil of California which said that the unit plan was made by voluntary agreement between operators and lessees of lands within the unitized area—Union, Standard, Robert Sumpf et al, Helm Company, Superior and F. L. Sanger et al. Union, with an initial equity of about 79 per cent, is operator of the unit. Union and Standard at present are the only organizations with production in the unit area. The unit agreement covers 4771 acres of which 800 have been proved productive. A unique aspect of the plan is that it has been subscribed to prior to the delineation of the full productive sector. Extension wells are still to be taken down and the agreement further provides for equitable redistribution of equities as new wells push out the area of production. The Polvadero pool was found by Union in February of 1955. To date 26 successful wells have been drilled and 1,985,000 barrels of oil produced. Current yield is about 1900 barrels a day.

West Richgrove Wildcat Under Way

Lori Exploration Company is drilling toward target depth with its Lori No. 1 wildcat test on Section 28-24s-26e in the West Richgrove area in Tulare County. The drill site is some 2500 feet northwest of the Clifford H. Marker, Operator, Di Giorgio No. 1, which was abandoned a month ago at 4995 feet. Lori No. 1 will be taken to approximately 5200 feet. Engineering is being handled for the company by Ement Carroll of Bakersfield. In the Deer Creek area, W. G. Johnson's Andrews No. 1 test on Section 17-22s-27e has been written off as a duster at 2013 feet. National Producers Petroleum Association has its Rose Marie

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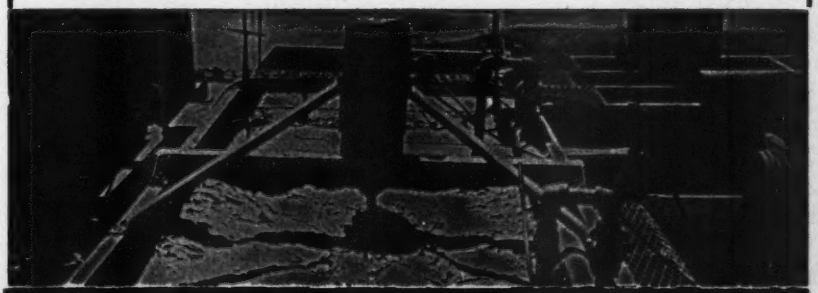

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No. 1 wildcat going on the same section. In the Strathmore area, Brown & Soults' No. 1 explorer on Section 32-20s-27e is idle at 889 feet.

Sunset Adds Gonyer Well

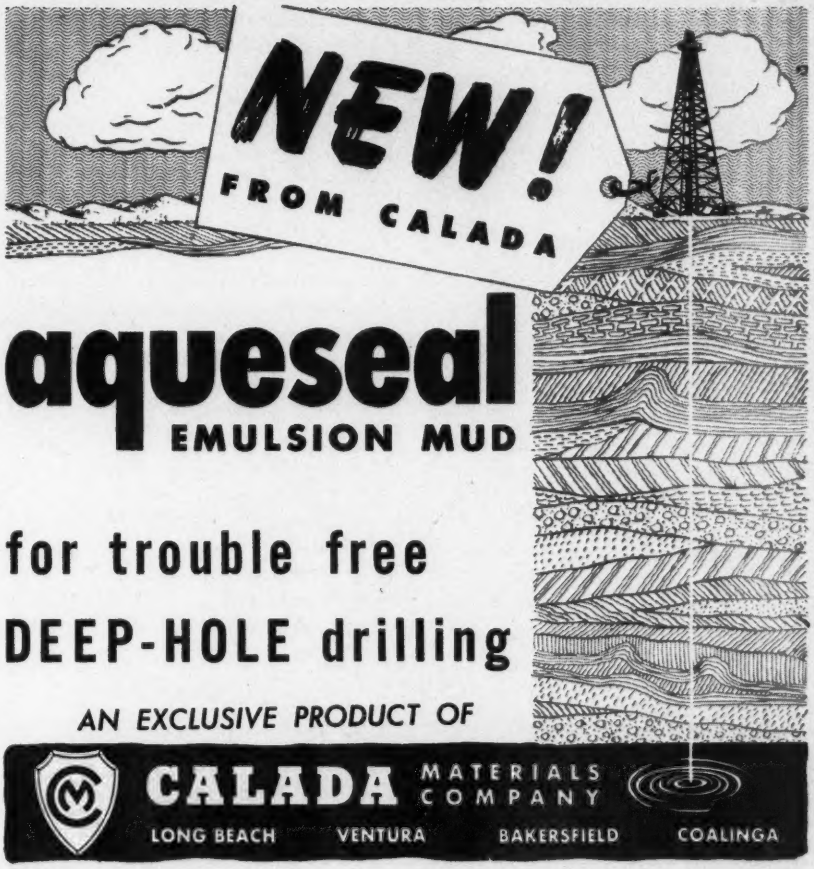
Starting off at the daily rate of 53 barrels of 15 gravity oil a day on the pump, Sunset International Petroleum Corporation's Continental-Gonyer USL No. 1 wildcat scored a shallow oil discovery on the Gonyer Anticline, five miles southwest of Taft and three miles west of the Midway-Sunset field. There are signs that subsequent drilling jobs can be successful at even shallower depths than the new producer, which is tapping 113 feet of oil sand at 1685-1798 feet. Sunset and Continental jointly hold 3778 acres in the play.

Puente Hills Wildcat Quits

Drilling has stopped at 1804 feet with Lewis Guerrieri's Greuter No. 1 wildcat test on Section 10-2s-10w in the North Puente Hills of Los Angeles County. Tom Reed Gold Mines Company is expected to get going shortly with its Rowland No. 1 test on Section 22-2s-10w.

San Joaquin Valley Leases Being Taken

Universal Consolidated Oil Company is among operating organizations that recently have added to their land holdings in San Joaquin Valley. Universal acquired 318 acres from Southern Pacific Land Company in the east half of Section 3-21s-28e and two miles west of Lamont. The property is between five and six miles northwest of Union Oil Company's discovery on the Stenderup lease in the Mountain View-Arvin area. Ferguson & Bosworth has leased 310 acres in the Arvin area in Section 3-32s-29e from the Keith E. Mitchell family, Mabel B. Severson and others. The Texas Company recently leased 360 acres on Section 32-20s-22e near McKittrick from Mr. and Mrs. Elmer B. Stone. Near Famoso on Highway 99 north of Bakersfield, Mark O. Deeter recently signed up 760 acres on Section 3 and 4-2s-26e. Lessors were Mr. and Mrs. Raymond Castanchoa and Famoso Land & Development Company. The south half of Section 1-31s-28e in the Mountain View sector has been leased by Richfield Oil Corporation from Mr. and Mrs. William Mosesian, Ethel W. Lee, Albert Suckut and Mr. and Mrs. Stanley E. Willis. South of the old Buttonwillow gas field, The Texas Company has signed 160 acres on the northeast quarter of Section 18-28s-23e.



Harbor Set For Increased Drilling

A pronounced upsurge in new drilling in the Los Angeles Harbor area within the next six months is generally foreseen. The Harbor Commission has received a report giving recommendations for the program to be followed in granting oil and gas exploration drilling leases. The commission authorized the report by Stanley & Stolz, engineering and geological consultants, after a previous oil study in the harbor area indicated that wildcatting would be an economically sound move. Union Oil, Continental Oil, Shell Oil and Superior Oil have requested the commission to include them in all negotiations of Standard Oil, G. E. Kadane & Sons and Edwin W. Pauley. The Harbor Department currently receives about $500,000 royalties a year from drilling activity on its land. The new report said that lease provisions should incorporate four basic conditions; payment of a cash bonus at the time the lease is granted, a gross royalty, a minimum annual royalty and a percentage of the net revenue after recovery of costs.

Brea-Olinda Well Started

Brea Canyon Oil Company's No. 72 well on Section 2-3s-10w in the Brea Olinda field is drilling steadily ahead below 1000 feet, with Santa Fe Drilling Company as contractor. General Petroleum Corporation has completed its Olinda No. 103 on Section 8-3s-9w in the field at 5710 feet for an initial output of 115 barrels a day, cutting 65 per cent.

East Coyote Test Staked

Pomoco, Inc., has staked location for Pomoco No. 1 test on Section 19-3s-9w in the East Coyote area of Or-

ange County. George C. Atha is handling the geology and is understood to hold an interest in the company.

Yorba Linda Test Abandoned

On Section 22-3s-9w and on Block 10 in the Yorba Linda tract in Orange County, A C O P, Inc. has abandoned at 3000 feet its Apalategui No. 1 wildcat test.

Avila Well Set To Drill

Charles C. Townsend is about to spud-in with townsend-Gunter No. 1 exploratory well on Section 18-31s-12e in the Avila sector of San Luis Obispo County. Zillgitt Drilling Company is contractor.

City Drilling Job Making Progress

Near the intersection of north Broadway and Bernard street in Los Angeles, Paul F. McKenzie has reached 350 feet with his No. T-2 test on Section 22-1s-13w and has run pipe.

Oxnard Field Adds Extension

The Texas Company has completed its Diedrich No. 1 well for a 920-foot extension to the west from production in the McInnes pool of the Oxnard field in Ventura County. The well, on Section 2-1n-22w, started off at the daily rate of 790 barrels of 29.4 gravity oil a day through an 18/64-inch bean from the Sespe interval at 6402-6495 feet. This is the third producing well finaled in the new Diedrich sector of the McInnes pool. It is located one and one-half miles east of Oxnard townsite. The project was guided to success by Graham & Klassen, contractor. Standard Oil Company's Gordon Estate No. 1 on the section was a previous completion at 6360 feet. It was last reported flowing 355 barrels of 26 gravity oil a day through a 10/64-inch orifice. Gas yield is 82,000 cubic feet daily. Casey & Montgomery handled the chores.

Santa Paula Test Ended

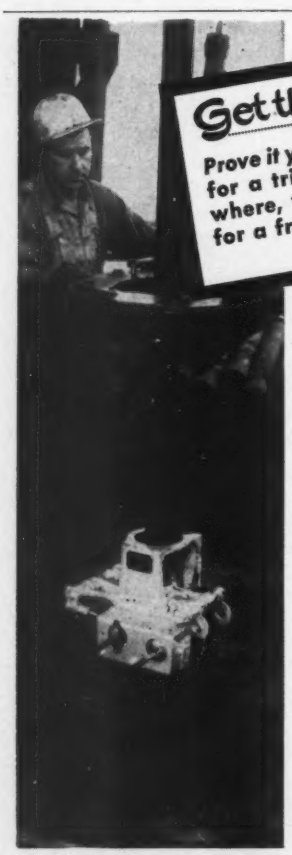
On Section 27-4n-21w at Santa Paula Creek in Ventura County, Joseph W. Drown has walked away from his Harvey wildcat at 2181 feet. A final check was made with Schlumberger before the project was abandoned.

Honor Rancho Wells Drilling

The Texas Company is drilling at 5700 feet with its Honor Rancho A (NCT-2) No. 16 well on Section 8-4n-16w in the Honor Rancho field. Fish lost several hundred feet higher was recovered. Superior Oil Company's N. L. & F. No. 7 on the section is drilling at 7400 feet.

Gas Pipeline Being Installed

Southern California Gas Company is installing another five-mile section of 20-inch pipeline to enlarge the capacity of the Kettleman-Lemoore line to meet the growing demand for gas deliveries in San Joaquin Valley. The new line will carry gas from Kettleman Hills to a point near Lemoore for distribution to Visalia, Hanford, Tulare, Porterville and other communities. Completion is scheduled for not later than January 1, 1957.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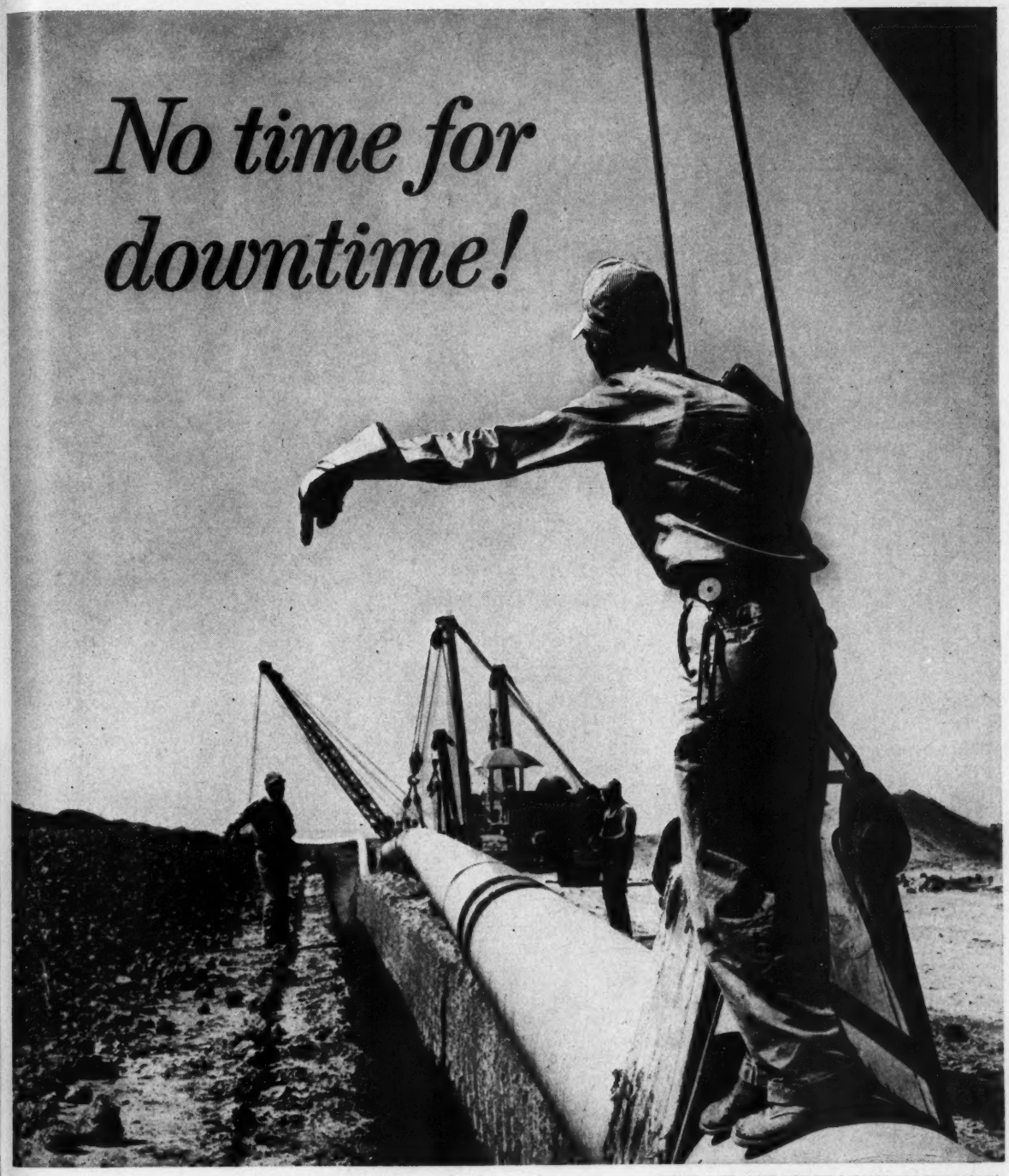

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Rocky Mountain NEWS

Colorado—Idaho—Montana—New Mexico—Utah—Wyoming—Western Canada

Crude Prices

Two major oil companies have posted increased prices for Wyoming sour crude, effective December 1.

Continental Oil Co. posted price increases ranging from 1 cent per barrel for 35 degree gravity crude to 40 cents per barrel for 15 degree gravity crude. There was no price increase on crudes over 35 degree gravity.

L. F. McCollum, president of Continental, said the increase reflects an increased demand for fuel oil and asphalt crudes.

Ohio Oil posted prices 10 cents higher than previously paid for black crude from sour fields and 20 cents higher at another.

Navajo Leases

Standard Oil of Texas posted the high bid of $315,161.60 in the third of a series of oil and gas lease sales on the Navajo reservation. The auctions were held at Window Rock, Ariz. Sixty-one tracts were sold at the auction, with three tracts receiving no offers.

Standard of Texas bid $123.11 per acre for tract No. 54A, in 27n-14w, northwest of Bisti field.

The average price paid per acre at the sale, which was the last one of the series, was $19.56, and the total bonus was $2,963,051.34. At this auction, 158,505 acres were offered and 151,465 acres were leased.

Total bonus for the three sales of Navajo leases was $33,686,327.20.

Utah

Interest continues to focus on San Juan County, the Recapture Creek area and the Aneth field. Gulf Oil Corp. recovered a flow of 128 barrels of fluid, mostly oil, in an hour and a half test at the No. 1 Indian, c ne ne 1-41s-22e. Recovery was made after acidation at 5800-10 and 5768-90 feet. In a previous test at 5753-5804 feet, operator recovered 55 barrels of oil in three hours. The test is three and a half miles southwest of Recapture Creek and is west of previous production in the area. The operator will drill an offset, the No. 2 Desert Creek-Federal, c w½ ne 1-41s-22e.

Four miles to the northwest of Recapture Creek, Three States Natural Gas will drill a test of the Pennsylvania, the No. 1 South Bluff, sw nw nw 12-40s-22e.

Petro-Atlas Corp. has staked location for the No. 1 Federal, c nw ne 24-40s-23e, a mile and a half west of the Aneth field and between it and Recapture Creek. This also will be a Pennsylvanian test.

Three States Natural Gas was continuing tests at the No. 1 Federal-Arrowhead, w½ ne ne 14-40s-23e, San Juan County, after recovering a flow of 10 barrels of oil per hour on a drill stem test of the Paradox at 5627-5700 feet.

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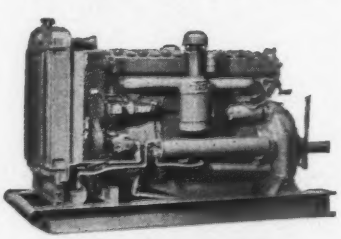

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Cymric Test Well Staked

Franco Western Oil Corporation has staked location for McKittrick Fee No. 101-X on Section 8-30s-22e in the Cymric area in Kern County. It is a designated 4000-foot test of the Olig sand.

Offshore Core Hole Initiated

Monterey Oil Company is under way with its Monterey-Seaboard-Humble-State 1550 No. 1, the first core hole drilled from the offshore drilling platform, which was commissioned some weeks ago. It is working seaward from Huntington Beach in Orange County.

Fairview Test Ready To Drill

G. R. Nance, Inc., is all set to drill Segerstrom No. 1 on Section 4-6s-10w in the Fairview area, Orange County. The project, a 7500-foot test, is located one mile west of the town of Fairview and 300 feet south and east

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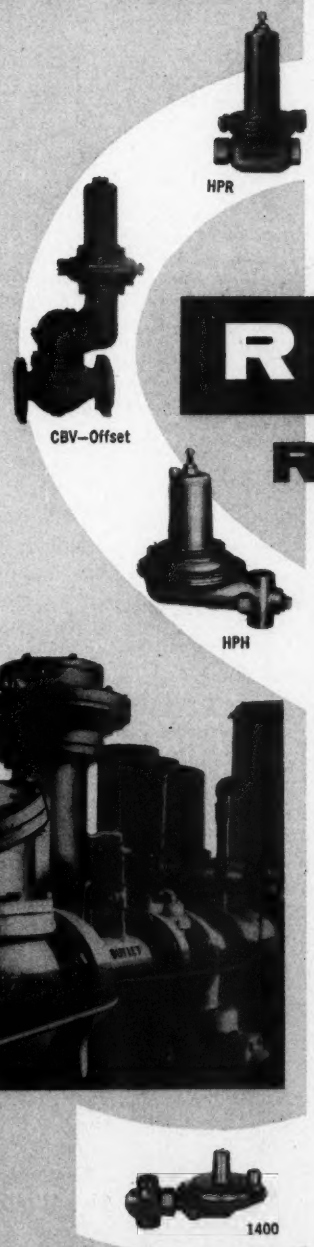

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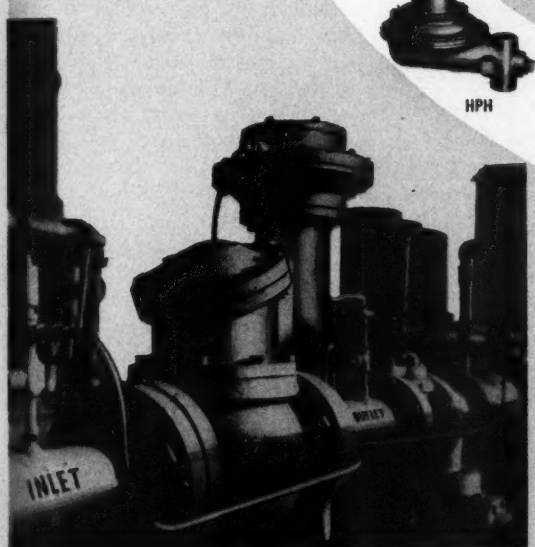

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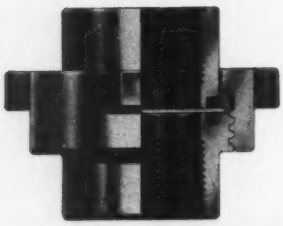

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of Long Beach Oil Operators' Segerstrom No. 1, which was abandoned early last February at 6320 feet. Oil and gas showings logged at 5500-5900 feet and 6270-6320 feet were not up to commercial standards. Engineering is being handled by Lee Moir, with drilling contractor Ben Owens.

Towsley Canyon Well Abandoned

In the Towsely Canyon area of Los Angeles County, Water Flood Oil Company has given up its Hamon No. 4 well. Drilling was carried to 1175 feet on Section 8-3n-16w.

Alferitz Well Nears Spudding

General Petroleum Corporation is about to spud-in its Alferitz No. 21-3 well, 320 feet south and 990 feet east from the northwest corner of Section 3-25s-18e in the Alferitz Anticline field, Kern County. The drill site is one location west of the company's No. 31-3 deeper pool discovery, recently completed for 260 barrels of 47.5 gravity oil and 650,000 cubic feet of gas a day from 4245-4529 feet. The initial cut was about 20 per cent.

New Mexico

Skelly Oil will abandon the No. 1 Duff, c sw se 19-26n-13w, San Juan County, after drilling to 5503 feet total depth. Some oil was found on a drill stem test at 5302-14 feet but was noncommercial and accompanied by a large amount of water.

In Rio Arriba County, Skelly is drilling a Dakota test at the No. 6 Jicarilla C. This company drilled a Dakota discovery in 1955, the No. 1 Jicarilla C, sw ne se 22-25n-5w, a mile north of the current test.

Sinclair Oil and Gas was preparing to drill a Gallup test at the No. 1 Santa Fe Chico, c ne sw 20-17n-5w, in McKinley County.

Great Western Drilling found oil and gas shows at the No. 1 South Chaco and was preparing for further cores. The well is in c ne nw 6-22n-8w, in San Juan County.

Reynolds Mining is drilling a pre-Cambrian test at the No. 1 Navajo, se se nw 22-31n-17w, San Juan County. It is scheduled for 8500 feet.

Shell Oil Co. has found shows, apparently in the Paradox, in tests of the No. 1 Cahone Mesa, se sw sw 14-40s-25e, San Juan County. After drilling to 5988 feet total depth, the well was shut down for repairs. It is five miles east of the Aneth field.

In the Cataract Canyon area of San Juan County, the Texas Co. abandoned the No. 1 Unit, n½ nw se 28-32s-19e. Cores in the Mississippian showed some oil stain. The wildcat was drilled to 4944 total depth.

Cities Service has reported a Pennsylvanian oil discovery in Lea County in the completion of the State AX No. 1 for a daily oil production of 1022 barrels.

The company said the pool discovery is located on a 1280-acre unit owned by Gulf, Shell, Pure and Superior, with Cities Service sharing slightly more than 50 per cent. The majority interest also has 1000 additional acres in the vicinity of the discovery. The test, in se nw 14-18s-35e, was drilled to 12,341 feet in the Devonian and plugged back to 10,978 feet in the Pennsylvanian.

Colorado

Standard Uranium and Beehive Uranium have completed their Garfield County gas discovery for an estimated production of 18,000,000 cubic feet of gas per day. The well is the No. 1 Young se nw 6-8s-102w, with production obtained from the Buckhorn at the interval 3085-97 feet. Four other apparently successful wells have been drilled in the area since the discovery.

Oil which nearly filled the hole was recovered by Malco Refineries in a drill stem test at the No. 1 Kowach, c nw nw 25-6n-90w. The well is a wildcat in the Buck Peak area of Moffat County. Recovery on the test, with tool open four and a half hours and taken at the interval 9180-9428 feet, was 8800 feet of oil. Producing zone is the Chinle. In previous tests, operator recovered gas from the Mesaverde and also some oil from the interval 6398-6423 feet.

Southwestern Exploration found oil shows in a drill stem at the No. 1 Schroder, c nw nw 20-33s-45w, Baca County. Operator is drilling below 5500 feet.

Jack Rouse and Don Rounds have completed their No. 1 Monaghan, c nw nw 8-3s-65w, in Adams County, for Dakota production of 100 barrels of oil per day. Production was obtained at 8300-09 feet.

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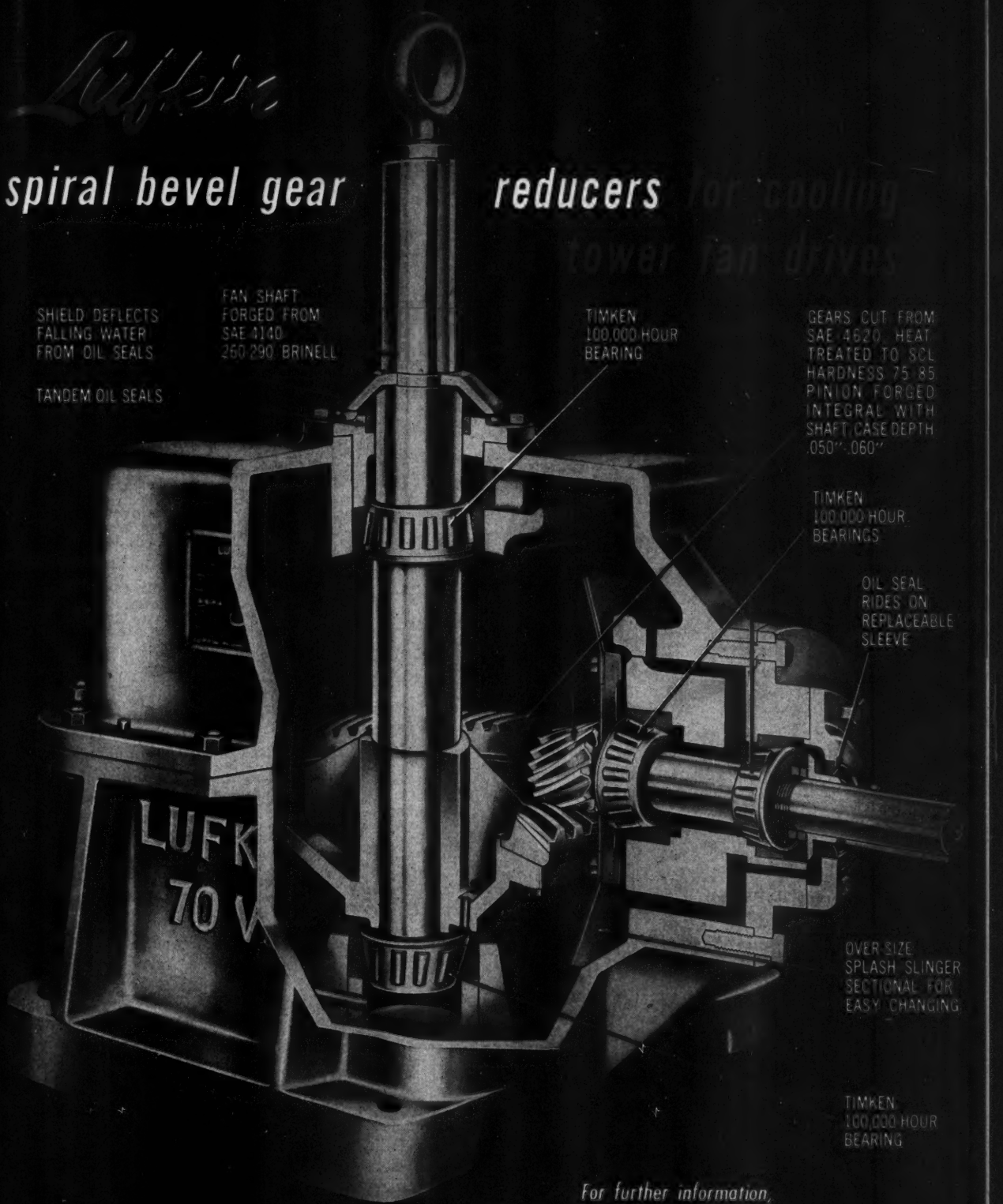
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ther tests at its Weld County discovery, the No. 1 Brunner, c sw sw 26-7n-67w. In an earlier drill stem test of the Lyons, at 8960-90 feet, operator recovered 692 feet of clean oil.

Wyoming

A gasser in Sublette County has blown out of control and still was running wild at last reports. It is estimated the well will produce several million cubic feet of gas per day. The well, drilled by Vaughn B. Connelly, independent of Alexandria, Va., is the No. 1-C-32, located in nw nw ne 32-27n-113w, on the west flank of the LaBarge field. When it blew in it unloaded all mud in the hole and damaged the rig, also blowing the roof off an adjoining building. Connelly has drilled several tests in the area and has has others scheduled both in Sublette and Lincoln Counties.

The success of a confirmation to the Tensleep discovery in the East Salt Creek field of Natrona County has been assured with drillstem tests at the No. 9 Govt., East Salt Creek A, c ne nw 15-40n-78w. A test of the Tensleep at the interval 7524-74 feet recovered 1540 feet of 31.4 gravity oil, 140 feet of heavily oil cut mud and 90 feet of slightly oil cut mud, with the tool open 70 minutes. A second test in the interval 7574-7633 feet recovered 120 feet of drilling mud, with no oil shows present. In a third test, however, at 7641-84 feet, open one hour, the recovery was 980 feet of oil and 280 feet of slightly oil cut mud. The well is 2600 feet southeast of the No. 8 East Salt Creek A, se nw sw 10-40n-78w, which opened Tensleep production in the field. Sinclair Oil and Gas Co. and others drilled the discovery and confirmation.

Sinclair has 51 per cent interest in a 2560-acre block, with the balance being shared by Kenilind Oil and Gas Co., Inc., Isbrandtsen Co., Inc., and Baruch Oil Corp., Inc. Sinclair has 360 full interest acres in the area, and Sinclair and partners hold some 7250 additional acres in the area. The discovery well swabbed and flowed at the rate of 1944 barrels of oil daily from perforations at 7542-70 feet. Previous production in the area has been from the shallower Wall Creek and Lakota sands.

Five miles southwest of the Donkey Creek field in Campbell County, Mobil Producing recovered 400 feet of free oil from the Dakota at the No. F-44-1-G Govt., se se 1-48-69w. The test was taken at 6766-92 feet, and along with the free oil, recovery also included 90 feet of mud cut oil and 2250 feet of slightly oil and gas cut water.

The California Co. is drilling below 4450 feet at its Teton County wildcat, the No. 1 Unit, sw ne nw 25-44n-111w. The location is five miles west of Brooks Lake.

Muddy production in the Ritter area of Natrona County apparently has been confirmed at the True Oil Co.'s No. 2 Govt. Ritter, c se sw 31-32n-84w. In a three-hour packer test at 6390-6491 feet, operator recovered 250 feet of heavily mud cut oil, 60 feet of slightly oil cut mud and 170 feet of drilling mud. Production casing was cemented at 6498 feet, and the well is shut in pending perforation and completion testing. Delta Drilling Co. et al previously made a Muddy discovery in the area.

Montana

Amerada Petroleum is continuing tests at the No. 1 Tange, c ne se 20-36n-53e, in Sheridan County. Oil production was found both in the Silurian and Red River formations. The Silurian was topped at 9018 feet and the Red River at 9582 feet.

Phillips Petroleum et al will drill a 7000 foot test to the Lodgepole at the No. 1 Tribal J, c ne ne 23-13n-45e, in Valley County. The wildcat will be eight miles northwest of the Wolf Springs field of Roosevelt County.

New Drilling and Tenison Drilling, who are making a Heath test, scheduled for 5000 feet, at the No. 1 Magelssen, c nw nw 31-11n-35e, in Rosebud County, were last reported drilling around 4200 feet.

In Yellowstone County, Lion Oil has started a Tensleep test at the No. 1 Hereford, sw ne nw 1-1n-28e. It is 30 miles northwest of the Hardin field.

Continental Oil abandoned the No. 1 NP, c se nw 29-10n-32e, in Rosebud County. The test was drilled into the Cambrian and was abandoned at 7830 feet total depth.

Mobil Producing is drilling below 9200 feet at the No. F-43-3-NP, c ne se 3-4s-44e, Rosebud County, after finding encouraging shows in the Devonian. A test was taken at the interval 9150-63 feet, with recovery of 30 feet of oil cut mud. Shows also were found in a core at 9163-78 feet.

In the Neves area of Dawson County, Shell Oil found slight shows in the Devonian at the No. 24-17 Kolberg, c se sw 17-19n-53e. At last report, operator was drilling below 10,200 feet.

North Dakota

Amerada Petroleum is drilling around 11,900 feet at the No. 1 Iverson-Nelson, nw se ne 2-155n-96w, in the Beaver Lodge field of Williams County. In a drill stem test at 11,187-574 feet, operator recovered gas at the rate of three million cubic feet per day and five barrels of 50.6 gravity oil in 35 minutes. Cores taken at the interval 11,632-785 have disclosed additional shows.

In Bottineau County, North Central Oil was installing pump at the No. 1 Pearson, nw nw 36-163n-83w, where production has been found in the Mission Canyon. In a drill stem test at 4005-21 feet, operator recovered 400 feet of free oil and 100 feet of heavily oil and gas cut mud, and in a test at 4007-21, the recovery was 210 feet of free oil and 60 feet of heavily oil cut mud. A swab test at 4004-21 feet through open hole, yielded from 10 to 15 barrels of fluid per hour, including 8 per cent water. The well is 13 miles southwest of the Kuroki field.

North Central has abandoned the No. 1 Kjeseth, ne ne 29-163n-82w, after drilling to 4262 feet total depth. A drill stem test taken at 3890-3905 feet was encouraging, yielding 150 feet of oil and 600 feet of water, but a second test at 3905-15 feet recovered 550 feet of sulphur water and 50 feet of slightly oil and gas cut mud. North Central currently is drilling the No. 1-A Pearson, se se 20-163n-83w.

South Dakota

This state has returned to the "rigs running" column after an extensive lull in drilling activity. Shell Oil Co. is drilling at the No. 32-27 Govt., 10 miles southeast of the Custer field in Harding County. Amerada Petroleum Corp. was rigging up rotary tools for the No. 1 U.S.A. Holland, four miles east of Gustav and three miles southeast of the same operator's failure at the No. 1 Short Pine Hill Unit.

Nebraska

Miracle-Fifer Drilling is moving in materials for the No. 1 Van Pelt, c se se 23-18n-55w, a Banner County wild-

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Flange, 6" — 600 6" — 900 Series	6"-7"

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A little over 12 miles northeast of the Craig field, Shell Oil is drilling the No. 1 Sherlock, c se sw 11-21n-50w, Morrill County. Shell also was preparing to drill a Cheyenne County test, the No. 1 Nelson, c se nw 8-13n-52w.

Chandler-Musgrove is drilling a confirmation to the same operator's J sand discovery in Kimball County. The confirmation is the No. 1 Rodman B, c se nw 27-15n-55w. The discovery was the No. 1 Rodman, c nw nw 27-15n-55w, which was completed on pump for 239 barrels of oil per day.

Shell Oil has staked location for the No. 2 Huffman, c nw nw 34-20n-53w, Banner County. It will offset the No. 1 Huffman, c sw nw 34-20n-53w, which was completed in the D sand for 102 barrels of oil, pump gauge, per day.

Braden Drilling and Stuarco Oil have abandoned their Kimball County test, the No. 1 Longinaker, c ne ne 13-13n-58w. Although some shows were found in the interval 7116-7174, no test was made. The well was drilled to 7222 feet total depth.

Western Canada

Husky Oil and Refining, Ltd. and partners scheduled a series of 25 wildcats in southeastern Saskatchewan during December as an extension of extensive exploration activity in that area. The company, in a news letter to shareholders, announced that out of 17 wildcats previously drilled, four important discoveries had been made, and a fifth indicated discovery was awaiting tests.

The company also referred to its participation in the new Dick Lake unit, located between Homeglen-Rimbey and Westerose fields in Alberta. The company said, "This is one of the most important natural gas and condensate discoveries in Canada so far this year." The letter stated that the unit has yielded gas at rates up to 12 million cubic feet per day and condensate at 37.5 barrels per million cubic feet of gas from a 550 foot thick pay zone.

Brinkerhoff Drilling Co., Ltd., which is drilling a series of tests in central Alberta, made substantial recovery at the Brinkerhoff-Hudson's Bay 13-26 Ardrossan. The wildcat is in 1sd 13, 26-52-22w4, 11 miles east of Edmonton. On a drill stem test of the D 2 formation topped at approximately 4040 feet, recovery was over one million cubic feet of gas per day and 375 feet of 38 degree gravity oil. A second drill stem test of the same formation was taken, also yielding oil and gas. Hudson's Bay Oil and Gas Co., Ltd., farmed out the acreage to Brinkerhoff.

Fluor Products Company Appoints Pickup Company

The Air Conditioning and Refrigeration Cooling Tower Division of Fluor Products Company, a Division of the Fluor Corporation, Ltd., announces the appointment of C. E. Pickup Company as exclusive representative for the Los Angeles area.

The Air Conditioning and Refrigeration Cooling Tower Division of Fluor Products Company is devoted exclusively to the engineering, pre-fabrication and marketing of a complete line of cooling towers for the air conditioning and refrigeration industries.

The C. E. Pickup Company is located at 134 No. Greenleaf, Whittier, California. Telephone: Oxford 4-3168.

Mt. Diablo Buys Mascot Oil Assets

Mt. Diablo Company has purchased all assets of Mascot Oil Company and oil production of the expanded organization now approximates 850 barrels a day from 160 wells, according to T. D. Bonney, president. Stockholders of both companies approved an offer of 312,500 shares of Mt. Diablo shares for Mascot and the latter now will be dissolved, it was explained. Present officers of Mt. Diablo, in addition to Bonney, are Ross McCollum and J. W. Schmid vice presidents; E. L. Harbach, treasurer and assistant secretary, and Irma Gregg, secretary. These four also make up the board of directors, together with J. C. Wright, Wells Morris, C. C. Scharpenberg, Sydney Smith and Stark Fox.

Oil Base Completes New Brochure

Oil Base, Inc., Compton, California, pioneer producer of Oil Base Muds, Emulsion Muds and Non-Fluorescent Drilling Fluids, have just completed a brochure on the establishment of a system to assure accuracy of long-wave ultra-violet analysis, to prevent misinterpretation of fluorescent "show" in cores and cuttings.

Drilling fluids that have fluorescent properties make black-light analysis of cores and cuttings incorrect and misleading. Comparison of the fluorescent properties of various crude and refined oils is shown versus the use of a non-fluorescent oil for emulsion drilling muds. Also included is a comparison in color photography of the difference between thread lubricants having both fluorescent and non-fluorescent properties. An actual copy of the study is included for your perusal.

The technical information is the result of many years laboratory and field correlation of commonly used oils in drilling muds from various producing areas. 58 unretouched color photographic reproductions made under both white and black light includes visual effects of heating samples at 280 F. to show what changes occur under temperature to most refined oils.

This important technical information is of extreme value as reference material to all persons having responsibility for drilling, testing and logging decisions and is available on written request from Director of Research, Oil Base, Inc., 130 Oris Street, Compton, California.

Manchester Avenue Company Winds Up

An interesting little yarn has for its subject the Potrero Country Club at Inglewood. One of the original members of the club was Dwight G. Vedder, veteran California operator. Vedder carried seven memberships in the club, with each membership costing $500. When royalties coming to the club through oil development on its property reached an important level, the Manchester Avenue Company was formed to handle this lucrative business. Each member of the club received six shares in the Manchester Avenue organization. The club property of 128 acres was sold recently for $1,300,000 and the MAC wound up its business with a final distribution of $900 for each share held. In view of this, Vedder received about $40,000 for what cost him originally $3500. Members in the future will receive their share of royalties through a trust company.

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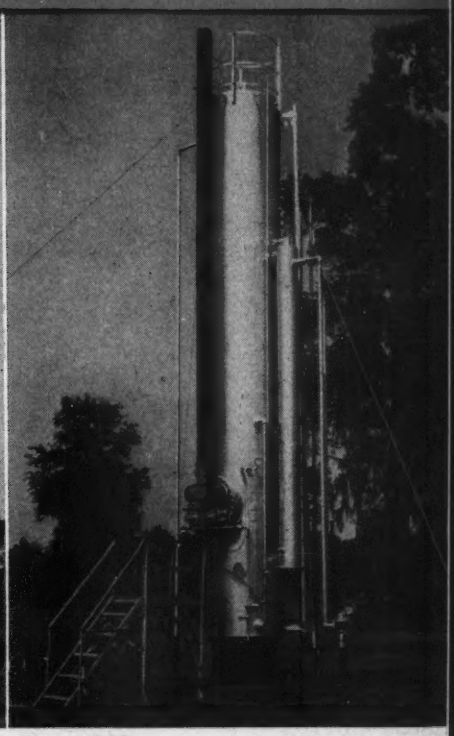
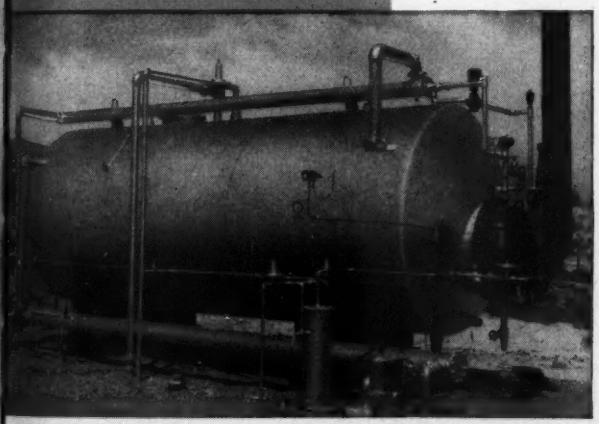
Type "S" The BS&B Type "S" Vertical Treater is a well balanced unit with excellent performance characteristics for low cost treating under average conditions. Available in sizes to treat 100 to 2500 bbls. of oil per day.



Type "J" The BS&B Type "J" Vertical Treater is a high performance level unit designed to handle large volumes of oil, water and gas on "tough" treating jobs. Available in sizes to treat 100 to 3600 bbls. of oil per day.



Model "HGT" Where a Horizontal Treater is indicated because of large volume requirements, broader distribution of weight on marshy ground, wind loading and anchoring conditions, etc. we strongly recommend the BS&B Model "HGT"." This treater will handle even the "toughest" treating jobs under the most adverse conditions. Available in sizes to treat 100 to 16,000 bbls. of oil per day.

Some makes and types of treaters operate at much higher efficiency than others under a given set of operating conditions. Some require a lot of expensive "down time" for maintenance and repairs. But lease operators of *experience* know that when they buy a BS&B Treater, they need have no concern on either count.

No matter how "average" or how "tough" the operating conditions on *your* lease, there's a right size and type of BS&B Treater for the job *you* have to do! BS&B Treaters are famous throughout the industry for their optimum operating results at lowest operating cost.

Don't be "shortchanged" by operating any treater on your lease that fails to deliver *maximum return per dollar invested!* Your BS&B Man will be glad to assist you in selecting the best treater for *your* conditions.

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and get the job done...RIGHT!

Personalities IN THE NEWS

Byron Jackson Tools Holds Regional Sales Managers Meeting

In attendance at the semi-annual sales conference of the Regional Sales Managers of Byron Jackson Tools, Inc., which was held recently in Fort Worth, were: W. C. Brooks, Western Region; C. F. Vincent, Southern Region; V. C. Horner, Manager of Sales; G. F. Nicolson, Vice President and General Manager; J. P. Magoffin, Rocky Mountain Region; E. M. Rees, Export Manager; W. F. Roberts, Oklahoma City salesman; Ray Taylor, Works Manager, BJ-PB Rubber Products; T. W. Jurling, Chief Engineer, BJ Oil Tool Products; R. J. Evans, Mid-Continent Region. Pictured above L. to R.

During the meeting the group reviewed new BJ products, including the 500-ton elevator-spider, the 500-ton Hydroplex hook with positioner, the Red Top Centralizers and Scratchers and other BJ tool improvements. The men also heard a progress report on the "Watch BJ Red" campaign, previewed new promotional color films on BJ elevators, and BJ Tongs and were thoroughly familiarized with forthcoming advertising and sales promotion plans.

Thomas P. Pike, former California drilling contractor and now serving the Federal Government in Washington, was a recent Los Angeles and San Francisco visitor. Pike's duties with the Government now are centered on coordinating and expediting the President's programs with the 10 Cabinet Departments and several of the independent agencies.

One of the current developers at Palm Springs is widely known Oil Man George Cameron. Cameron, who started as a wildcatter in Oklahoma and built himself a huge fortune, is sponsoring the town's third radio station. He purchased the weekly newspaper, the Desert Sun, a year ago and it is a thriving daily. He also is putting up a Cameron Center, a 12-acre development, featuring high class shops and a restaurant to be known as "The Springs" and costing $750,000.

Leon Moore, James O. Eakin and Richard E. Jamison are directors of the new Standard Directional Drilling Company of Ventura, Inc. Headquarters are at 2330 North Ventura avenue, Ventura.

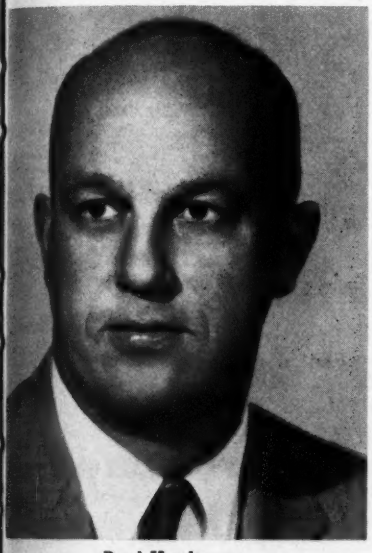
Newly elected officers A. P. I. Los Angeles Basin Chapter, left to right, seated: Bill Prigge, Kobe, Inc., Secretary-Treasurer; Don S. Hare, Monterey Oil Company, Chairman; Harold E. Nissen, Signal Oil & Gas Company, Vice-Chairman. Standing, L. R.: Sam Crooks, Standard Oil Company of Calif.; Membership Committee Chairman; Jim Buckingham, HOMCO, Public Relations Chairman.

Former Subsidiary Companies Merge With Paul Hardeman, Inc.

Paul Hardeman, President of Paul Hardeman, Inc., constructors - engineers, has announced the merger of the various subsidiary companies formerly in the Hardeman group with Paul Hardeman, Inc. All activities will be carried on under the name of Paul Hardeman, Inc.

According to Mr. Hardeman this consolidation will make it possible to better administer contracts and projects, thereby benefiting the many clients of the corporation and its divisions.

Effective November 1, 1956, all activities of J. B. Gill Co., Wall Cryogenics, Inc., Climate Conditioning Corp., Systems Engineering Co., and Electronetics Corporation were consolidated and became a part of Paul Hardeman, Inc.



Paul Hardeman

J. B. Gill Co. and Wall Cryogenics, Inc., were combined and are now known as the J. B. Gill Division of Paul Hardeman, Inc. Each of the other companies retained its name and is called a Division of Paul Hardeman, Inc.

This unique group, together with the Hardeman Pipe Fabricating Division and Fire Sprinkler Division, are now consolidated in a single operating company which is beneficial to prospective and present clients because of greater efficiency and lower cost.

Paul Hardeman, Inc., is engaged in construction and engineering projects from coast to coast and has been closely associated with defense, guided missile, petroleum, chemical, and industrial projects. The organization is a completely integrated group furnishing construction and engineering facilities in electrical, instrumentation, cryogenics, mechanical and structural phases.

The firm's home office is in Los Angeles, with branches in San Diego, Bakersfield, Sacramento, Denver, Jacksonville and Caracas, Venezuela.

H. H. (Bob) Roberts of Los Angeles, manager of public relations for Standard Oil of California in Southern California, is currently vacationing in Eastern points. His first stop after leaving Los Angeles was Milwaukee, where he was in attendance at the national meeting of the public Relations Society of America. Roberts is a director and California chapter representative of the PRSA.

Lloyd Lewis has organized the Lewis Drilling Company in Bakersfield and is keeping a Bethlehem M-58 rig busy. He formerly was toolpusher for Clyde Hall Drilling Company.

Harold F. Green has been named secretary of the Reserve Oil & Gas Company, Jasper W. Tully, president, has announced. Green, who has been assistant secretary of the company, succeeds W. M. Holloway, vice president and secretary, who remains vice president.

H. M. Van Clief, Honolulu Oil Corporation, has been elected chairman of the San Joaquin Valley chapter of the American Petroleum Institute. Van Clief, superintendent of Honolulu Oil's California division at Taft, succeeds Harry D. Campbell, Franco Western Oil Company. John Fraser, Union Oil Company of California, has been named vice chairman in charge of programs; Bob Torrey, Southern California Gas Company, second vice chairman in charge of memberships; and Don Everitts, Ohio Oil Company, third vice chairman to serve as secretary-treasurer.

William Malcolm (Mickey) Reilly, 42, who once worked for Standard of California in San Joaquin Valley, died on a South Pacific island where he was associated with an A-bomb test project as a civil service employee. He was a brother-in-law of Walter Keene, publisher of the Daily Midway Driller.

The appointment of Allan F. Schroeder as Advertising Manager for the Cardwell Manufacturing Company at Wichita, Kansas, has been announced by J. T. Tucker, General Manager of Sales for the Company. In making the announcement, Tucker stated that Mr. Schroeder will be responsible for advertising and sales promotion of Cardwell products through its world wide organization.

Schroeder joined the Cardwell organization thirteen years ago. During that time, he has been responsible for a variety of phases of the company's operations. He is a graduate of Wichita University.

Richfield Oil Corporation has donated $40,000 to the Los Angeles Community Chest campaign. The gift was presented by Charles S. Jones, Richfield president, to Courtland Gross, chairman of the major corporations division of the campaign.

New Servcoloy Catalog

A new, three-color, eight-page catalog describing Servco's new Servcoloy process, a revolutionary new method of oil well milling at phenomenal speeds, is now available.

The new catalog describes the Servcoloy process (pat. pend.) and the Servco tools, such as section mills, whipstock mills, liner mills, junk mills, rotary shoes, etc., which utilize the process.

Nothing indicates approval of a magazine like a renewal subscription check.

THIS LAUGH OFF!!

"Where are you going on your vacation?"

"Haven't decided yet. I want to take a trip around the world, but my wife wants to go some place else."

O'Leary was determined to pass his favorite saloon on his way home. As he neared it he became somewhat shaky but gathering his courage he managed to make it by. After going about 25 yards he turned, saying to himself: "Well done, O'Leary, me lad. Come back and I'll treat ye."

First old maid: "I shiver every time I think of a man kissing me."

Second old maid: "And here I'd been thinking you had St. Vitus dance all these years!"

Judy: "I want a man who is good, handsome and intelligent."

Trudy: "You don't want one, you want three."

Psychiatrist: "And what's your trouble?"

Patient: "I've been misbehaving and my conscience is bothering me."

Psychiatrist: "And you want me to strengthen your will power?"

Patient: "No, weaken my conscience."

The circuit rider was asking the hillbilly girl if he could speak to her father.

"Naw, sir," said the girl, "Daddy's in the pen."

"Well, then," said the minister, "what about your mother?"

"Mamma's in the county sanitarium," said the girl, "she was seein' things."

"Perhaps I could speak to your brother," said the minister.

"Naw," said the girl, "he's away at Harvard."

"Oh," said the minister, brightening, "That's fine, what is he studying?"

"He ain't studyin' nothin'," said the girl, "they're studyin' him."

Draftee: "They can't make me fight!"

Draft board clerk: "Maybe not, but they can take you to where the fight is and let you use your own judgment."

"Mandy, do you know anything of my wife's whereabouts?"

"Well, I ain't sure, but I believe I put 'em in the wash."

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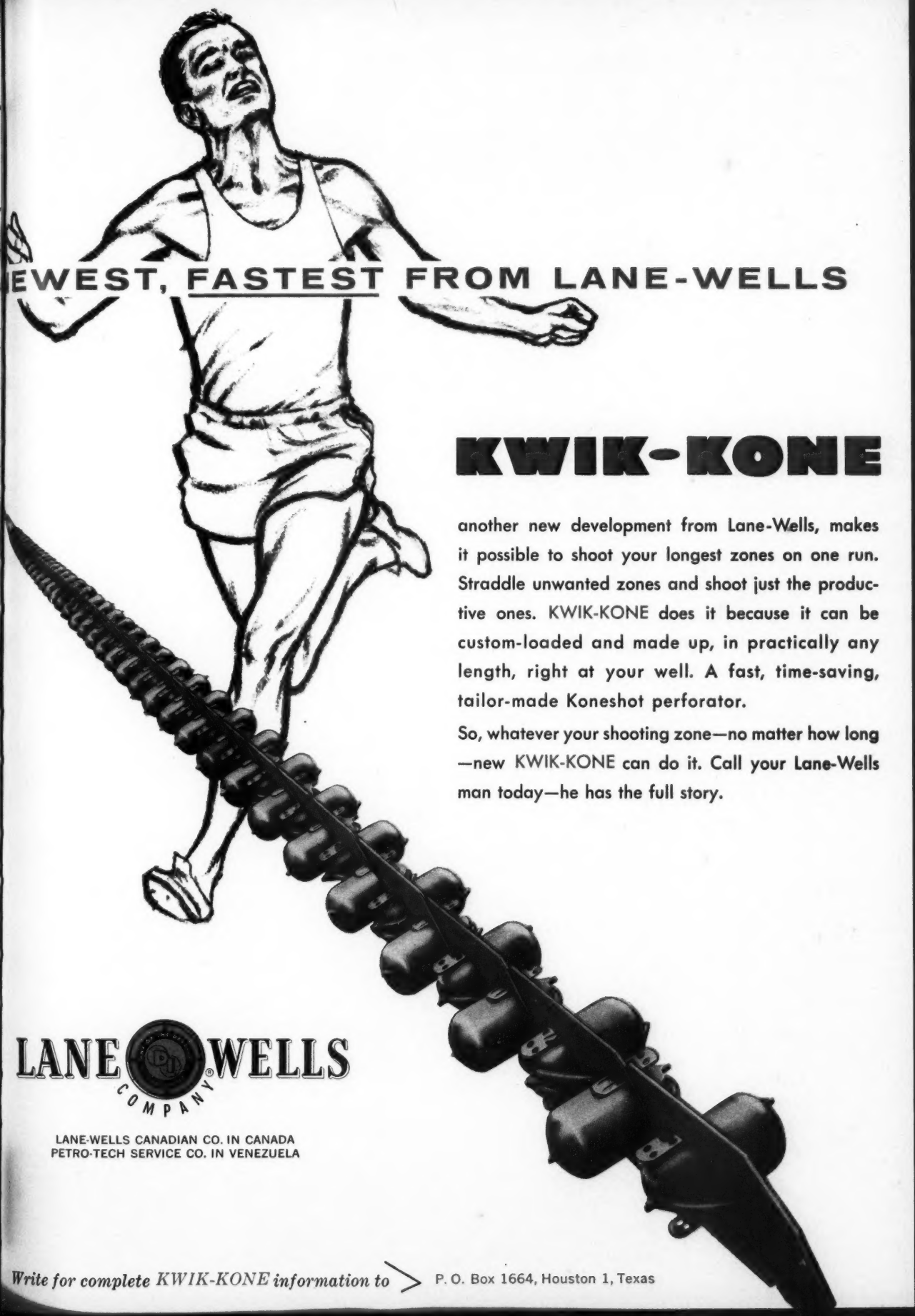
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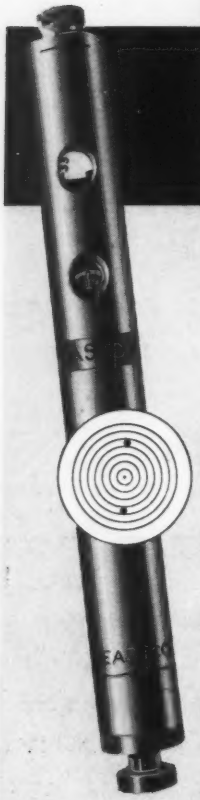

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